

## Chapter 2

# Countertrade and Offsets

## An Overview of the Theory and Evidence

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### 2.1 Introduction

Offsets — where the vendor agrees to undertake some reciprocal transaction over and above that associated with a purely cash transaction — are not confined to military sales. However, where the purchase of *civil* goods gives rise to this reciprocity, this phenomenon is typically known as countertrade. Moreover, just as there are various forms of offset associated with defence purchases, there are various types of countertrade connected with the procurement of civil goods and services. Although the focus of this book is on offsets, the reader should be aware of the parallel and at times overlapping literature on countertrade not least because research in one area can inform developments in the other.

The purpose of this chapter is to outline the various forms of countertrade, evaluate the economic theories that have been proposed to account for this phenomenon, and to review the literature dealing with empirical work. With this background, the reader should be able to place the subsequent discussion on defence offsets within the wider context of reciprocal sales agreements as a whole. To put these issues into context further, the chapter concludes with a parallel overview of offsets.

### 2.2 Countertrade — Definitions

Although countertrade is a global phenomenon, different countries use different terms to describe the same practices and, as a result, no internationally consistent use of terms has emerged. Understandably, the literature on countertrade is also troubled by this lack of a consistent lexicon and thus any discussion of the topic has to be preceded by a definition of terms.

Pure **barter** involves the simultaneous exchange of one product for another.<sup>1</sup> Most barter is accomplished via government-to-government transactions through a series of barter exchanges that are consolidated into a **clearing arrangement**.<sup>2</sup> Both parties agree to purchase a specified (usually equal) value of goods and

services from each other over a given period. Each country establishes an account that is debited when ever one country imports from another. At the end of the specified period, imbalances are cleared through the transfer of goods or hard currency payments. The introduction of the clearing arrangement facilitates the non-instantaneous settlement of barter transactions. If the debtor country has a shortage of hard currency and the creditor does not want repaying in goods, the creditor can sell, at a discount, its 'credits' to a **switch trader** who will use these credits to purchase goods from the debtor nation. These will then be sold in world markets.<sup>3</sup>

With the possible exception of the final settlement, none of the barter transactions mentioned above involve the use of any currency. Under a **counterpurchase** deal, the (usually western) exporter will agree to take goods and services, from a shopping list and at prices established by the importer, to the value of the initial export. In this countertrade transaction, however, hard currency is involved in the form of two parallel contracts: one for the sale of the initial export, and one for the purchase of goods and services from the importer's shopping list. Similar to counterpurchase transactions are **buy-back** deals. Once again, the exporter agrees to purchase goods from the importer. However, in this case the exporter transfers technology (usually embodied in plant and equipment) and agrees to purchase a proportion of the plant's output over a specified period. As with counterpurchase deals, there are usually two parallel hard currency transactions. First, the importer borrows the hard currency and uses this to pay the exporter for the plant. The importer of the plant then uses the proceeds of the sale of the output (obtained in whole or in part from the vendor of the equipment) to repay the hard currency which was borrowed to purchase the equipment.

Having defined terms, many authors go on to discuss the quantitative importance of countertrade in total world trade. Unfortunately, trade statistics do not differentiate between direct sale and transfer of goods under any form of reciprocity. In addition, no national government requires firms to report data on these types of transactions. Thus only approximate estimates of this form of trade are possible.<sup>4</sup> Moreover, this is one area where countertrade and offsets are often lumped together.

The growth in countertrade and offsets can be illustrated by noting the number of countries that typically demand such reciprocal trading arrangements. In 1972, 15 primarily centrally planned economies (CPEs) mandated countertrade, with 27 in 1979 (with the addition of some Central and South American states), and 67 in 1983 (although the latter figure rises to 88 if countries that request offsets are included.<sup>5</sup> By 1992, a total of 130 countries had some form of countertrade/offset policy.<sup>6</sup>

The OECD estimated that in 1983 countertrade accounted for a maximum of around \$80 billion, or some 5 per cent of world exports.<sup>7</sup> This is one of the most frequently cited figures in the literature although other, much larger, estimates exist. Bilateral clearing arrangements are excluded from this estimate. The OECD values this annual trade at \$130 billion and thus if this is added to the earlier figure of \$80 billion, then countertrade accounts for just over 13 per cent of world trade. Many other estimates of the importance of countertrade in world trade in the mid-1980s exist. Korth argues that GATT estimates of 8 per cent of world trade for countertrade are conservative, suggesting a level ranging from 5 per cent to 20 per cent, possibly higher.<sup>8</sup> The UK's Department of Trade and Industry reports that estimates vary, with a general belief that the actual proportion lies between 10 and 15 per cent of world trade<sup>9</sup> and UNCTAD estimates that countertrade accounts for at least 15 per cent of world trade.<sup>10</sup> For an even larger figure, Hammond cites James P. Moore Jr, Deputy Assistant Secretary for Trade Information and Analysis, who, in testimony before the US House Subcommittee on Economic Stabilisation, alleged that 'a significant number of government and non-government experts and observers estimate that countertrade accounted for between 20 and 30 per cent of the roughly \$2 trillion of total world trade in 1983'.<sup>11</sup> Basically, precise figures are not available.

### 2.3 Countertrade — Economic Motives

Identifying and evaluating the reasons for countertrade fill more than a few pages in the literature. Before plunging into such an exercise, the reader might find the following, highly stylised, overview useful. Since the 1960s, the CPEs of Eastern Europe had frequently demanded countertrade when dealing with Western companies.<sup>12</sup> Towards the end of the 1970s, a few newly industrialised countries (NICs) and less developed countries (LDCs) began to make similar demands and, by the mid-1980s, this trickle had become a torrent with some form of countertrade almost *de rigeur* for the completion of any Western export sale in the East or South.

As countertrade grew, so too did the literature on the subject; most of this can be divided into one of two categories. First, and for those practitioners actually involved with countertrade, there were the guides to the successful negotiation and undertaking of countertrade deals. These publications often outlined various countries countertrade requirements.<sup>13</sup> Second, and for a rather different audience (the academic community), there were countless papers, particularly in the early 1980s, drawing the reader's attention to this relatively new form of trade. These papers would usually discuss possible reasons for this growth and

whether and to what extent government-mandated countertrade was the appropriate policy response to the supposed conditions that had given birth to this phenomenon.

Within the academic literature, several distinct themes can be identified. First, there is the very hostile view which tends to emanate from multi-national organisations such as GATT, the IMF and the OECD, which views countertrade as a threat to those (typically western exporters) who have such requirements foisted upon them. In addition, this activity is also portrayed as being harmful at the global level.<sup>14</sup> The argument is that, because of its bilateral nature, countertrade has the effect of reducing trade to the level of the country with the lowest export capability. Moreover, such bilateralism runs counter to the spirit of an open and multi-lateral system of international trade as embodied in the GATT.<sup>15</sup> In addition, the need to balance trade at the microeconomic level (that is for each deal or firm) will have a more pronounced limiting effect than an equilibrium set at the macro-economic level.<sup>16</sup>

Second, and often espoused by the same authors, there is the view that those governments that mandate countertrade are ill-informed/irrational because there is little that countertrade can achieve and that, as a result, those who pursue such policies are misguided.<sup>17</sup> A variant of this argument is that although these transactions might appear advantageous in the short-term they are likely to perpetuate the existing distortions that have given rise to the need for countertrade in the first place. There is also the argument that countries resort to countertrade as a way of avoiding (more politically harmful) structural adjustments, which are typically stipulated by the IMF as a condition for further lending.<sup>18</sup>

Third, there is a growing group of commentators that cautions against immediate opposition to all countertrade transactions. Typically, these authors suggest that the costs and benefits of each transaction need to be evaluated and that there can be no necessary presumption that all countertrade is inefficient.<sup>19</sup>

Finally, there are those who see the various forms of countertrade as a rational response to the costliness of effecting some types of transaction along the more conventional cash-for-goods lines,<sup>20</sup> while Caves and Marin develop a model of barter/counterpurchase that offers benefits to both parties in a rational-actor model.<sup>21</sup> According to proponents of these views, countertrade is the optimal way to structure transactions in certain circumstances and is to be preferred to the more conventional cash-for-goods approach. It is also worth noting that in some parts of the literature the reasons for these reciprocal arrangements are discussed as if the various types of countertrade form a homogeneous whole. However, this level of generalisation looks particularly costly as other work suggests that the different forms of countertrade grow out of different trading conditions.<sup>22</sup>

Before moving on, let us remind ourselves that the major issue when examining the reasons for countertrade is to explain why a, say, CPE importer would make its purchase of goods from, say, a western exporter, conditional upon a reciprocal purchase by the initial exporter of CPE goods, rather than sell the goods direct on world markets. Various hypotheses have been advanced and these are now examined.

### 2.3.1 Easing foreign exchange shortages (all forms of countertrade)

One of the reasons often advanced for government-mandated countertrade is that it protects the often small foreign exchange reserves held by various East European states, NICs and LDCs. Indeed, many accounts of official countertrade requirements cite this motive as one of the reasons for the existence of such a policy.<sup>23</sup> However, critics argue that 'it is ... unlikely that countries resort to countertrade because of shortages of foreign currencies and, if they do, they are likely to be disappointed'.<sup>24</sup> To illustrate their argument, Mirus and Yeung structure their discussion around two widely accepted ways of defining the current account:

1. current account = exports-imports + net services
2. current account = saving by the private sector + saving by the public sector-investment

The authors argue that, in this context, expression (1) is not particularly useful as all it reveals is that a countertrade transaction, with exports by definition equal to imports, has no impact on the current account. This is clearly true. However, Mirus and Yeung do not explicitly outline what would have happened in the absence of the countertrade transaction although, implicitly, the assumption is that no trade takes place. In both cases, the current account is identical, although with countertrade imports are higher than they would otherwise have been. If another alternative scenario is adopted, that in both cases imports are at their higher level, then with countertrade the current account is improved by the volume of exports that the policy brings about. It is, presumably, for this reason that many countries expect and believe that mandated countertrade conserves foreign exchange (i.e. that the policy generates additional exports). Of course, if the initial exporter can dispose of these goods then it is not clear why the producer cannot do so directly, rather than via a countertrade requirement. Instead, Mirus and Yeung focus on expression (2) and consider how countertrade (in the forms of counterpurchase, buy-back and barter) might affect those factors, such as the level of income, the rate of interest, the cost of capital, and the rate of profit, which determine the national level of savings and investment,

and, ultimately, the current account. The authors conclude that countertrade is likely to have little net impact on the balance of trade.

Rather curiously, in another paper the same authors argue '... that foreign exchange shortage or rationing and other forms of capital control can explain some countertrade ...'.<sup>25</sup> Their argument is that, where foreign exchange is rationed in the importer's country, a Western exporter might accept payment in terms of a commodity in order to move the deal forward in time and to reduce the uncertainty of whether the necessary exchange will be available to facilitate the transaction.

More interestingly, Mirus and Yeung also consider the situation of a country which has a high external debt and a shortage of foreign exchange, which is being denied further hard currency loans. In these circumstances, and with export earnings earmarked for debt service, it might be possible to increase imports if countertrade exports are able to escape the attention of international creditors seeking repayment. As the authors acknowledge, this scenario depends on the asymmetrical treatment of countertrade exports (compared with other exports), and requires that either countertrade escapes the creditors' audit or that creditors are naïve. Mirus and Yeung believe that these conditions are '... not applicable to too many situations'<sup>26</sup> but other commentators find evidence to support this hypothesis.<sup>27</sup>

Banks notes that there are two rationales for countertrade where there is an over-valued currency and foreign exchange controls.<sup>28</sup> First, local firms can continue trading when they exhausted their allocation of foreign exchange. Second, the terms of exchange can be adjusted to a more mutually agreeable rate for the particular transaction. This is equivalent to a selective devaluation or the establishment of multiple exchange rates.<sup>29</sup>

### **2.3.2 Dumping, price cutting and price discrimination (barter/ counterpurchase)**

One clear attraction of countertrade is its reduced transparency relative to cash-based transactions. If, for example, international agreements attempt to fix prices above their world market-clearing levels, producers will have an incentive to dispose of their surplus production by under-cutting the agreed price. Barter offers the opportunity to dispose of export surpluses, typically of primary commodities, without having to state explicitly the price of the good and thus risk the charge of threatening the cartel's existence. Similarly, many industrial countries subsidize their agricultural sectors, with support prices above market-clearing levels. To avoid having to acquire and store the surplus production, governments can dispose and have disposed of this stock on world markets at

subsidised prices. Again, barter can obscure the price at which this stock is being sold, thus reducing the possibility of a complaint to GATT.<sup>30</sup> It has also been argued that barter can assist market segmentation, directing lower-priced sales to more price-elastic or low-income markets but it is not clear why this capability is specific to barter.<sup>31</sup> Indeed, Caves and Marin discuss the role that both barter *and* counterpurchase can play in facilitating price discrimination and their findings provide some support for this hypothesis.<sup>32</sup> (This study is discussed in more detail below.)

### **2.3.3 Economising on search/transaction costs in the international marketing of products (barter/counterpurchase)**

Many commentators have suggested that counterpurchase enables participants to:

- a. sell goods, which, because of their poor quality would not normally be sold in export markets; and
- b. to increase exports of other goods through access to new markets.

Banks for example, argues that unless the Western firm is very large and diversified, it will usually sell counterpurchase goods at a discount to a specialist trading company rather than use the goods itself.<sup>33</sup> This raises the issue of why the producer does not purchase the marketing expertise of the specialist trading agencies direct rather than via the Western firm.

Mirus and Yeung argue that a barter transaction might facilitate the disposal of a *temporary* excess supply of a good with lower search and transactions costs than if the sale went directly through the market.<sup>34</sup> Typically, additional exports would incur extra search and transaction costs for the manufacturer. The argument is that, by using the Western firm's superior marketing knowledge for this one-off transaction, the manufacturer can dispose of the countertraded goods more efficiently than if it attempted to do this itself or via a marketing agent.

Various authors have argued that counterpurchase can be used as a device to reduce the risks and costs of arranging the international marketing of products.<sup>35</sup> Hennart's argument is particularly interesting, suggesting as it does that independent distributors might be reluctant to make the transaction-specific investments necessary for the successful distribution of products in foreign countries, because distributors fear being "held up" by manufacturers once the investments are made. One solution to this problem, that of vertical integration of manufacturing and trading, is not available in countries that limit incoming FDI. By restricting imports to those from suppliers who take back and market their products, counterpurchase requirements can encourage suppliers to make manufacturer-specific marketing investments that would not otherwise be undertaken.

### 2.3.4 Signalling product quality (buy-back)

Murrell argues that buy-back can reduce problems that arise when the quality of, say, East European products is unknown or the country has a poor reputation with regard to quality.<sup>36</sup> If the country wants to sell higher quality goods in the West, it must signal that these products are of a better quality than it normally produces. Murrell suggests that the use of the Western firm's capital equipment, and the distribution of the resulting product by the Western firm, both signal that the quality of these products is better than normal. This arrangement increases the price at which the output can be sold in the West, and thus the value of the western firm's capital equipment.

### 2.3.5 Information asymmetries in technology markets (buy-back)

One of the major forms of countertrade is buy-back where an exporter (often a Western firm) will supply and construct an entire plant and, in addition, provide start-up training and supervision of maintenance and production. The exporter will also agree to buy a proportion of the output of the new plant over a period of years, often to the same value as the value of the initial export of capital. The question arises, of course, as to why either party should wish to link the purchase of the resulting output to the original sale of the capital equipment.

Very simply, the argument is that as the importer of capital does not know the value of the equipment *ex ante*, there is the potential for the exporting Western firm to sell outdated technology. By requiring the firm to purchase the resulting output, the seller who supplies old technology will be faced with the disposal of inferior outputs. Thus there is an incentive for the capital exporter to supply a technology which produces output that can be readily sold in world markets.<sup>37</sup> Although this encourages the supply of the appropriate technology, there is still the problem that the supplier might attempt to overcharge the purchaser although the existence of rival suppliers would, of course, ameliorate this hazard.

Mirus and Yeung examine this issue in some detail.<sup>38</sup> They assume that the capital/technology package produces a good with a distinct quality dimension which is determined by the quality of the technology package. The price of the package depends on its quality which is unobservable *ex ante* to the recipient but is, of course, known to the supplier. The information asymmetry encourages the technology supplier to overstate the quality of the capital that is being supplied. One possible solution, that of internalising the transaction by encouraging the supplier to establish their own factory, is ruled out as the recipient wants ownership of the output (i.e. FDI is prohibited). Consequently, no simple market exchange might occur as there is no way of verifying the price and quality of the capital/technology package.

If the recipient's concern was only for the project's profits then a profit-sharing contract would solve the problem. If the quality (price) of the capital is too low (high), then profits (having deducted the cost of capital), and hence the supplier's revenue, will be adversely affected. Thus there is less incentive for the supplier to overcharge for the capital it is supplying. However, the local agent might want a particular quality of technology and, the assumption is that the latest technology is sought. Mirus and Yeung argue that if quantity and quality are substitutes from the supplier's point of view, then by offering the supplier a fixed quantity of output for a specified number of years, the recipient has a means to influence the supplier's provision of quality.

Buy-back is also an incentive contract where a firm provides a production facility in return for some of the output for further use in its own production. The assumption is that the output is production process-specific, so that other firms could not easily use this intermediate good in their own production processes. It is also assumed that the initial exporter would find it difficult to secure a replacement for the input. Mirus and Yeung quote the example of the construction by Volkswagen of an engine production plant in what was the GDR.

Again, FDI is assumed to be prohibited, and the putty-clay nature of the project gives rise to a time inconsistency problem. As the sole purchaser of the output, the technology supplier has the incentive to depress monopsonistically the price of the output. Similarly, the purchaser of the technology might attempt to inflate monopolistically the price of the plant's output. In the extreme case, it is possible that no plant might be built. A contract specified in terms of prices would still suffer from a problem of double information asymmetry. First, the value of the output is much better known to the technology supplier than it is to the technology recipient and thus the former has an incentive to understate the value of the output. The supplier can also inflate the value of management and production services. At the same time, the lack of a competitive factor market in the CPE puts the technology supplier at an information disadvantage with respect to the productivity of local participation and might fear that the local partner will inflate their factor costs.

A contract specified in physical quantities overcomes the problem of quantity-quality substitution mentioned above and thus satisfies the recipient's desire for state-of-the-art technology. However, even where quality is not an issue, a quantity contract will conceivably induce the supplier to reveal his valuation of the product by furnishing technology to the extent that the marginal revenue from extra technology is equated to its marginal cost. Similarly the recipient has no incentive to waste labour resources. In this way, 'the counter-trade contract ... overcomes difficulties that ... prevent a market solution'.<sup>39</sup>

Chan and Hoy find an explanation for buy-back in a similar environment.<sup>40</sup> In their model, the host country prohibits foreign direct investment (FDI) and the multinational corporation (MNC) possesses a knowledge-based production process that requires skilled labour or information which the host country does not possess. The host cannot write legally enforceable contracts for the acquisition of a specified quality level of the MNC's production process. A joint venture would be one way to proceed, but either party might shirk if it is not the full residual claimant to the profits generated by the production facility. The authors show that a sharing rule for output or revenues as well as an enforceable set of minimum standards requirements on some inputs ameliorate the tendency to shirk. Hence buy-back and minimum standards for inputs yield a second-best outcome where the first-best (FDI) is prohibited by fiat.

Finally, Marin and Schnitzer have recently suggested that counterpurchase, in addition to buy-back, can be used to overcome information asymmetries associated with the export of technology.<sup>41</sup> In their model, the firm in the developed country (DC) is seeking to export capital goods to a CPE/LDC. As usual, the firm might be tempted to undersupply quality and blame adverse circumstances in the LDC/CPE. The LDC/CPE lacks creditworthiness because of a large outstanding debt and thus its purchase cannot be financed by a loan from an international bank. Hence the vendor is unsure as to whether it will actually be paid. Marin and Schnitzer suggest that the existence of a second deal which is tied to the first, deters cheating on quality and defaulting on the payment for the initial export as either action would jeopardise the second transaction. However, this argument would seem to depend on the assumption that the second deal is profitable to both parties, which might not always be the case.

### **2.3.6 The absence of long-term futures/forward markets and the reduction of uncertainty concerning the level of exports (all forms of countertrade)**

Banks argues that one of the handicaps faced by the CPEs is the absence of any self-equilibrating mechanism to ensure that the values of exports, imports and capital flows balance. One attraction of countertrade is that it is a balancing device.<sup>42</sup> To fulfil production objectives, certain items must be imported from, say, the West. Unfortunately, the demand for exports cannot be easily planned but should exports fail and further credit not be forthcoming, imports must be reduced with severe consequences for domestic production. Countertrade, by reducing the uncertainty associated with the trade balance, reduces the potential for the disruption of the CPEs. Hennart discusses this motivation in terms of risk shifting.<sup>43</sup> He argues that countertrade substitutes for missing forward mar-

kets by ensuring that any outlay of foreign exchange will be balanced by future inflows.

Along similar lines, Amann and Marin view counterpurchase '... as a second-best outcome in the absence of complete risk and futures markets'.<sup>44</sup> The authors construct a model in which a firm in a western industrialised country wants to export to a CPE or a LDC. The potential exporter faces an entry barrier in this market and, consequently, is willing to reward the CPE for its assistance to overcome this barrier. Facing a tight foreign exchange budget constraint, the CPE/LDC is very risk averse when choosing which goods to produce for future exports. Ideally, futures markets, by guaranteeing the price at which the CPE can sell its product, would enable the CPE/LDC to eliminate all risk associated with the CPE's future foreign exchange earnings, thus making the present foreign exchange constraint look less binding. However, such markets do not exist and so the DC's market entry depends on its willingness to provide such a private futures market in the form of a commitment to purchase at a future date the products produced by the CPE. The DC is willing to do this to gain market entry and because it is (assumed to be) less risk averse than the CPE (the latter point reflecting the fact that a firm in market economy can more easily spread risk than a CPE which has far fewer risk absorbing institutions).

Mirus and Yeung argue that buy-back might occur where a firm, with a specific advantage in mining and processing, wants guaranteed access to a raw material, yet there is no forward market and backward integration via FDI is impossible or prohibitively expensive.<sup>45</sup> For the owner of the resources that prohibits FDI, countertrade might be preferred to market sales where there are costs of market penetration and uncertainty concerning future sales. Basically, the buy-back contract establishes a forward market where none previously existed.

This review by no means exhausts the reasons why governments might impose a mandatory countertrade policy. For example, some of the other motives might be political. Yoffie argues that countertrade requirements can be used to disguise a government-sponsored austerity program.<sup>46</sup> A severe countertrade requirement leads to a decline in imports which the Third World government can blame on foreign corporations for failing to export (although Yoffie's argument seems to ignore the fact that the IMF is usually behind such austerity programs). Nevertheless, the most frequently quoted hypotheses for countertrade have been discussed. Some of these represent a first-best response to excessive transaction costs which might otherwise preclude the possibility of trade (e.g. by using counterpurchase where manufacturer-specific marketing investments are necessary). Others are clearly second-best responses where the first-best alternative is prohibited by government policy (e.g. where FDI is ruled out as a solution to information asymmetries associated with international technology transfers).

This is not to suggest that all countertrade can be justified as the optimal response to a particular set of trading conditions. Rather, that there might be circumstances where various forms of mandated reciprocity are superior to the more conventional cash-for-goods transaction and that, as a result, an unqualified hostility to countertrade is wholly inappropriate.

## 2.4 Countertrade — Empirical Overview

Despite the plethora of academic papers that appeared in the early 1980s, describing the various forms and growth of countertrade, it was not until the end of the decade that any substantive empirical work began to appear. This was not particularly surprising given the lack of readily available statistics and the fact that, as a result, any empirical work would be particularly labour intensive. Jones and Jagoe compiled a database of 1,350 reported countertrade deals signed between 1980–87 where at least one of the partners was a Third World country.<sup>47</sup> The authors used their data to provide an overview of countertrade trends. Their report runs to over 130 pages and the following paragraphs can only provide the briefest glimpse of the wealth of information that they presented.

Jones and Jagoe reported a rapid increase in the annual number of deals signed to 1985, with a slight decline in the following two years. This was mirrored by an increase in the number of developing countries actually involved in doing deals at any particular time. OECD countries provided the partner in 45 per cent of all deals while the Eastern bloc was a partner in 21 per cent, and other developing countries were involved in the remaining 34 per cent of deals. Their database also recorded the goods traded and the authors expected to find the developing countries exporting raw materials, foodstuffs and energy products (basic commodities) while importing capital equipment and manufactures. This pattern was largely confirmed by the data but an interesting trend emerged in the pattern of exports. Whereas foodstuffs accounted for 60 per cent of product observations in the 1980–1983 period, this had declined to 37 per cent in the 1984–87 period, and the importance of the manufactures had similarly increased. The authors interpreted this as indicating that developing countries had some success persuading countertrade partners to accept more manufactured goods, although it could also be interpreted as indicating that developing countries were simply manufacturing more, or manufacturing goods that they did not previously make. With regard to imports, agricultural commodities were again the most important category, with 25 per cent of product observations, although manufactures come a close second with 24 per cent. Also noted was the rapid increase in the import of construction projects. In the first half of the study

period, six instances of this type of import were recorded, whereas in the second half this figure soared to 101 cases.

Jones and Jagoe also examined the types of goods traded with each type of partner. In North/South trade, 71 per cent of developing country exports were basic commodities while 72 per cent of their imports from OECD countries were of capital equipment, manufactures and construction projects. Foodstuffs and raw materials accounted for 66 per cent of developing country exports to the Eastern bloc while in return developing countries received capital equipment, manufactures and construction projects, and these accounted for 76 per cent of imports. Agricultural products were the single most important group of commodities in South/South trade, accounting for 37 per cent of observations. Where available, the database also recorded the value of the transaction. Just over one-half of the 1,350 deals had a value attached to them, with the average being \$143 million. The authors consider this a surprisingly high figure and note that if 56 'mega-deals' (worth over \$500 million each) are omitted, then the average falls to \$57 million.

Although the Jones and Jagoe report provides a wealth of information about countertrade involving developing countries, it is unfortunate that they were only able to classify 21 per cent of the deals in their database according to the form of countertrade. Almost 79 per cent of transactions were allocated to a residual category which included barter, counterpurchase, and other unspecified transactions. In addition, little attempt was made to use the data to test hypotheses about the causes of countertrade. Nevertheless, the authors expressed scepticism about the idea that the export of basic commodities (such as coffee, cocoa and rubber) with a countertrade requirement confers any real advantage. The report argued that the underlying causes of countertrade in the 1980s (such as lack of foreign exchange, limited access to conventional trade finance facilities, depressed commodity prices and deepening debt) are likely to remain and thus that countertrade is likely to persist. However, the authors conclude by noting that little is known about the costs and benefits of countertrade policies and that, as a result, there is an urgent need to evaluate such policies.

It can be argued, quite reasonably, that Jones and Jagoe's work does not provide a global overview of countertrade as the focus is on deals involving Third World countries. Hveem's work makes good this deficiency by studying 1,071 countertrade contracts signed over the (somewhat shorter) period, 1985–88.<sup>48</sup> Like Jones and Jagoe, Hveem's database consists of countertrade agreements drawn largely from the countertrade press. Fortunately, the two studies are broadly consistent with regard to their coverage and definition of countertrade terms, although, for example, Jones and Jagoe include bilateral clearing arrangements which Hveem excludes. Unfortunately, the two studies adopt

different categorisations of the variables used to analyse the data (e.g. geographical groupings) and this makes it difficult to compare their results directly.

Hveem's data confirm the idea that countertrade is no longer an East-West phenomenon with this particular geographical configuration accounting for only 22 per cent of all deals. South-West trade is involved with 32 per cent of all transactions while East-South contracts provided 15% of all deals. Interestingly, the second largest geographical trade pattern was intra-South trade with 24% of deals.

Also of interest is the distribution of deals according to the particular form of countertrade. Counterpurchase accounted for 54 per cent of all transactions with buy-backs at 23 per cent and barter deals at 9 per cent.<sup>49</sup> The types of goods traded primarily consisted of industrial equipment (the most frequent), manufactures, basic commodities, infrastructure, and energy products. When the value (rather than the number) of the products was taken into account, however, the picture changed dramatically with energy and military equipment the top two products. The issue of whether countertrade 'works' is complex and not really addressed. Nevertheless, the Hveem paper is a substantial one and, as with the Jones and Jagoe paper, only a flavour of its contents has been presented here. The reader seeking more detail should consult the original work.

In a rather different vein, Lecraw uses data on 211 countertrade deals undertaken by 152 firms in the US, Canada, and Japan to test various hypotheses about the factors that contribute to the success of a countertrade transactions *from the perspective of the Western exporter*.<sup>50</sup> For each deal, the Western firm was asked to indicate on a scale of 1 (low) to 10 (high), the success of the countertrade arrangement and the strength of various characteristics of the exported product, the exporter, the importer, and the importing country. These characteristics included such factors as: export product quality, the number of direct competitors, the stage in product life-cycle, the product's price relative to the competitor's price, non-tariff barriers to export and so on. These factors were then used as independent variables to explain the respondents' evaluation of the success of the transaction.

Lecraw's model was able to explain just over one-half of the variance in the dependent variable and suggests that:

'Countertrade can be beneficial for large firms with extensive trade operations for large, complex products, firms that are vertically integrated or can accommodate countertrade take-backs, and for firms that trade with countries with inappropriate exchange rates, rationed foreign exchange and import restrictions whose importers are relatively inexperienced in assessing technology or in export marketing'.<sup>51</sup>

Although providing useful information on those factors that contribute to a successful countertrade deal, Lecraw's contribution would be considerably

enhanced if he had been able to perform a similar analysis *from the perspective of the importer*. After all, the issue is less why Western exporters (albeit often reluctantly) agree to countertrade, but rather why importers mandate some form of reciprocity rather than selling their goods for cash.

The third study of publicly reported countertrade deals was by Hennart who analysed 1,277 countertrade transactions detailed in the weekly newsletter '*Countertrade Outlook*' over the period June 1983 to December 1986.<sup>52</sup> Although much of his material came from the same source as that used by Hveem,<sup>53</sup> and their study periods had a two-year overlap, Hennart's paper provides an interesting contribution to as it attempts to use the available data to test the various hypotheses concerning reasons for the use of countertrade. Interestingly, Hennart found evidence to support the hypothesis that different forms of countertrade have different motives.

Hennart's database consisted of 694 clearing arrangements, 171 barter deals, 298 counterpurchase transactions, 71 buy-backs, and 43 offsets. Countries were allocated to one of five groups (developed nations, OPEC members, CPEs, middle-income counties and low-income countries). Hennart found that OPEC and developing countries imposed more counterpurchases, CPEs more buy-backs, and developed and middle-income developing countries (MIDCs) more offsets, than would be anticipated if there was no relationship between country group and form of countertrade.

Hennart also found that the most common form of barter involved two MIDCs and noted that this was consistent with the view that barter is used to avoid the repayment of external debt. Barter was prevalent between developed countries and MIDCs, and between MIDCs and CPEs. The author interpreted the absence of barter between OPEC members and between developed countries as evidence that this form of countertrade was used to bypass international cartels and commodity agreements.

Hennart found that counterpurchase was largely imposed by OPEC, MIDCs and CPEs on developed countries, while buy-backs were largely an East-West phenomenon. Offsets involved developed countries selling to developed countries, OPEC members and MIDCs. More generally, the data supported the established idea that countertrade was rife in North-South and East-West trade but, given the widespread involvement of MIDCs, it also suggested that South-South trade was important.

Hennart's study also identified the broad type of good involved in the countertrade transaction. For CPEs, the proportion of barter, counterpurchase, and buy-back sales that were manufactures was higher than the proportion manufactures in their overall trade. However, the evidence did not support Murrell's hypothesis that buy-back deals would be more likely to involve manufactures

than barter and counterpurchase (because product quality is more variable in manufactures than in food, raw materials, and fuels).

For OPEC members, 76 per cent of barter deals involved fuels while 11 per cent involved manufactures. For counterpurchase transactions, however, the proportions are reversed with 51 per cent involving manufactures and 10 per cent with fuels. Hennart argues that this confirms the different motivations behind these two forms of countertrade: that barter is used to undercut cartel prices while counterpurchase is used to penetrate new export markets.

For all developing countries, barter is heavily concentrated in raw materials (the very products typically supported by cartels), while counterpurchases are largely manufactures (which is consistent with the view that counterpurchase is a marketing tool for differentiated products). Hennart also grouped all countries according to whether their credit rating was above or below the median value and found that those in the below-median group accounted for 9 per cent of world trade, 16 per cent of buy-back deals, 25 per cent of counterpurchase transactions and 38 per cent of barter deals. This implies a strong inverse relationship between credit-worthiness and the propensity to barter, supporting the hypothesis that barter is used to secure imports rather than repay debt. Hennart also found that 80 per cent of all buy-backs were imposed by countries with very high or high barriers on incoming FDI and that this percentage is statistically significantly different from the percentage of world trade captured by these countries (15 per cent). Similarly, support for the idea that counterpurchases are substitutes for vertical integration between manufacturing and distribution was forthcoming: 65 per cent of all counterpurchase contracts were imposed by countries with very high or high barriers to incoming FDI, a percentage significantly greater than their share of world trade.

Finally, consider the study by Caves and Marin.<sup>54</sup> These authors develop a model of a barter/counterpurchase transaction where an exporter is seeking to sell a differentiated product to a state-ministry which, in turn, is seeking to export a product which is not normally exported. The quality of the latter good can be verified at a price, and a competitive industry of trading houses exists which will verify quality of goods and locate buyers for non-standard products. The state-ministry cannot resell the exporter's goods. This has the effect of making price discrimination feasible and '... stands in for the subtle ways in which countertrade facilitates discrimination ... [such as] the effective price paid for the export good is obscure to third parties'.<sup>55</sup>

Given this model, the authors derive a series of testable hypotheses which are evaluated using a database of 230 completed countertrade agreements from Viennese firms active in countertrade. Two-third of all agreements occurred in 1986 and 1987. Over 86 per cent of the countertrade partners were CPEs and, in

94 per cent of cases the exporter was a Western industrialised nation. Just under 77 per cent of the transactions were counterpurchase deals, 12 per cent were buy-backs, and 11 per cent were barter.

On the basis of their model and empirical evidence, Caves and Marin conclude that some countertrade is a result of price discrimination by the exporter although this '... model is enveloped by a more general model of countertrade as a device to bargain with an exporter who asks a price higher than its marginal cost'.<sup>56</sup> However, the authors do note that 'countertrade can offer some partners least-cost access to Western markets, as when the Western exporter can use the partner's goods directly' and caution that the model's explanatory power is not large, '... leaving ample room for the hypotheses that countertrade develops from non-convertible currencies or provides partners only the illusion of benefit'.<sup>57</sup>

## 2.5 Offsets — Definitions

Much of the discussion about the motives for countertrade assumes that at least one of the participants is a CPE/NIC/LDC and that any Western involvement will be as a potential exporter. When studying offsets, the military counterpart of countertrade, this characterisation is no longer valid. Indeed, whereas CPEs led the demand for countertrade, it was the industrialised nations of western Europe that initiated offsets when buying (US) defence equipment.

First, though, some definitions. Just as there are various forms of countertrade and no universally accepted definitions, so different categories of offset are distinguished, and different authors use the same term in different ways. The US Office of Management and Budget (OMB) has conducted more work on offsets than most other organisations and, for this reason, their terminology and definitions are given below.<sup>58</sup>

**Offsets** — A range of industrial and commercial compensation practices required as a condition of the purchase of defense articles and/or defence services. The various types of offset are defined as follows:

- a. **Co-production** — Overseas production based upon government-to-government agreement that permits a foreign government or producer to acquire the technical information to manufacture all or part of a U.S. origin defence article.
- b. **Licensed Production** — Overseas production of a U.S. origin defence article based upon transfer of technical information under direct commercial arrangements between a U.S. firm and a foreign government or producer.
- c. **Sub-contractor Production** — Overseas production of a part or component of a U.S. origin defence article. The subcontract does not necessarily

involve licence or technical information and is usually a direct commercial arrangement between the U.S. firm and a foreign producer.

- d. **Overseas Investment** — Investment arising from the offset agreement, taking the form of capital invested to establish or expand a subsidiary or joint venture in the foreign country.
- e. **Technology Transfer** — Transfer of technology that occurs as a result of an offset agreement and that may take the form of: research and development conducted abroad; technical assistance provided to subsidiary or joint venture of overseas investment; or other activities under direct commercial arrangement between a U.S. firm and a foreign entity.
- f. **Countertrade**
  - i. **Barter** — A one-time transfer only, bound under a single contract that specifies the exchange of selected goods or services for another of equivalent value.
  - ii. **Counterpurchase** — An agreement by the initial exporter to buy (or to find a buyer for) a specified value of goods (often stated as a percentage of the value of the original export) from the original importer during a specified time period.
  - iii. **Buy-back** — An agreement by the original exporter to accept as full or partial repayment products derived from the original exported product (e.g. a turnkey facility; machinery).

Several points are worthy of note about these definitions. First, the distinction between co-production and licensed production turns on whether the agreement is government-to-government or U.S. firm-to-government and *not* on the division of production between the US firm and the foreign buyer (compare this with the more conventional definitions given in chapter 1). Second, co-production and licensed production are included under the offset umbrella, although the Aerospace Industries Association of America (AIAA) argues that these forms of work-sharing are irrelevant to any discussion of offsets.<sup>59</sup> The AIAA's argument is that these transactions are no more offset-related than, say, the establishment of a U.S.-licensed electronics operation in Hong Kong. Third, that the standard forms of civil reciprocity are included under the usual countertrade heading, and that the conventional three-way distinction (between barter, counterpurchase and buy-back) is made. Reciprocal purchases of foreign-made civil goods would, of course, be included under the counterpurchase category. Finally, this categorisation does not readily lend itself to the differentiation of direct and indirect offsets, which characterises much of the literature. For example, sub-contractor production would be split between direct and indirect offset e.g. the production of components for the equipment actually being imported

would be direct offset whereas production for equipment for export to third parties would be indirect offset.

Data on the quantitative importance of offsets is scarce. As is the case for countertrade, no multi-national agency is responsible for the collection of these data, and only the U.S. government has sought information about offsets from industry. However, as the U.S. has been the largest western exporter of arms, accounting for two-thirds of all non-CPE arms exports over the period 1987–91<sup>60</sup> an analysis of this data set is likely to prove invaluable. Unfortunately though, the data only go back to 1980.

Before examining this data set, and to provide some insight into post-World War II procurement trends, this author put together a database on purchases of defence equipment by the EU12 over the forty-year period 1950–1990, which involved some form of offset. Here, three types of offset were distinguished: co-production, licensed production and indirect/direct offset (for definitions see chapter 1). This exercise drew on three data sources. Since 1973, SIPRI have published an annual register of the licensed production of foreign designed major weapons. Although this includes a number of sales dating from the previous decade, coverage of the immediate post-1945 period has been improved by drawing on the list of major system programmes collated by researchers working at the RAND Corporation.<sup>61</sup> This covers the licensed production of all major US defence equipment since 1945. The third source is Todd and Humble who provide information on the licensed production of aero-engines, a topic which both of the other sources neglect.<sup>62</sup> The only area where the database might be deficient concerns work-sharing agreements involving the production of European-designed equipment in the 1950s. However, such contracts are unlikely to have been that important quantitatively and thus their omission will not significantly distort the analysis (not least because in the 1950s there were substantial direct transfers of US-produced military equipment to bolster western defences against the Soviet threat). Nevertheless, as the database is unlikely to be free from error, the analysis concentrates on broad trends rather than the minutiae of individual projects. Moreover, a broad brush approach is far less vulnerable to the exclusion of a few relevant projects, the inclusion of a subsequently cancelled order, or to debates over the appropriate classification of a contract (e.g. licensed production or offset). The focus on EU12 procurement (rather than that of all countries), can be justified on two grounds. First, the data collection exercise is considerably reduced and, more importantly, it is well-known that western governments led the way in demanding offsets with their defence purchases.<sup>63</sup>

The evidence, summarised in Table 1, suggests that there has been a marked increase in the number of arms purchases by EU states involving some form of

production work-sharing. Co-production and offsets are relatively new phenomena, commencing in the 1970s, with offsets exhibiting a considerable growth in popularity in the 1980s. The paucity of work-sharing deals in the 1950s reflects the substantial direct transfer of US military equipment. By 1960, European industry had recovered from the ravages of the war and direct transfers were being replaced by the licensed production of US equipment e.g. the F-86 and F-104 fighters, the M113 Armoured Personnel Carrier, and a number of utility helicopters. Widespread European prosperity meant that governments were able and willing to pay the cost premium associated with licensed production for the technology transfer and other associated benefits.

**Table 1:** EU12 Work-Sharing Contracts by Date of Contract<sup>64</sup>

Years	Number of Contracts			
	Licensed Production	Co-production	Offsets	Total
1950–59	14	1	0	15
1960–69	34	0	0	34
1970–79	43	10	6	59
1980–89	48	8	26	82
Unspecified	22	0	0	22
Total	161	19	32	212

By the early 1970s, the economic climate was far less favourable. Moreover, state-of-the-art defence goods were becoming increasingly costly and licensed production was becoming a luxury few were willing to indulge. Nevertheless, when spending large sums of tax-payers' money, governments wanted more than just defence equipment: jobs, technology, an enhanced DIB, foreign exchange, and political support for such expenditures were also valued. Offsets offered, or at least seemed to offer, all of these.<sup>65</sup>

Table 2 reveals the distribution of these work-sharing contracts according to the type of product being purchased. As with collaborative projects, the dominance of aerospace (aircraft, aero-engines and missiles) is apparent and with this sector accounting for 82 per cent of all work-sharing contracts.<sup>66</sup> Although a few contracts for the higher technology and more costly land and sea systems have involved work-sharing (e.g. for frigates and MBTs), EU states have largely sought work-sharing arrangements when buying costly aerospace products.

**Table 2:** EC Work-Sharing Contracts by Product Purchased, 1950–89

	Number of Contracts			
	Licensed Production	Co-production	Offsets	Total
Aircraft	78	6	19	103
Missiles	50	12	9	71
Land	19	1	3	23
Sea	14	0	1	15
Total	161	19	32	212

**Source:** As for Table 1

Udis and Maskus argue that several characteristics of the aerospace sector make it a suitable target for industrial policy. First, defence purchases from this sector typically involve high-value contracts and thus have the potential to generate considerable economic activity. Second, the goods purchased often embody highly advanced technologies which might generate spillovers that could improve productivity elsewhere in the economy. Moreover, aerospace industries are highly concentrated and governments might use their purchasing power in an attempt to appropriate for domestic industry a share of the available economic rent. And because offsets are usually negotiated with firms that sub-contract work for the design and production of components, it is feasible for the prime to re-direct substantial amounts of work to suppliers in the purchaser's economy.<sup>67</sup>

France, the former FRG, and the UK have been the most active participants in collaborative procurement programmes.<sup>68</sup> However, Table 3 reveals that this is not the case for purchases where it is production work that is shared. In this case Italy is the purchaser with by far the largest percentage (25 per cent) of work-sharing contracts and with about one-half of this number of contracts each come a group of five countries: Belgium, the former FRG, the Netherlands, Spain, and the UK. Then come Greece and France each responsible for 7 per cent of the total number of work-sharing contracts.

This distribution of work-sharing programmes between the EU12 reflects differences in their defence industrial base. France, the former FRG and the UK, with relatively large defence budgets, have been willing and able to support a large advanced technology defence industrial base involved in an extensive range of air, land and sea systems. The ever-increasing real cost of high technology has encouraged them to share the development and production costs associated with

**Table 3:** EC Work-Sharing Contracts by Purchasing Country, 1950–89

	Number of Contracts				
	Co-production	Licensed Production	Offsets	Total Work Sharing	(%)
Belgium	4	16	4	24	11
Denmark	2	6	1	9	4
France	0	12	3	15	7
FRG	5	16	2	23	11
Greece	1	10	4	15	7
Italy	1	49	2	52	25
Netherlands	4	16	2	22	10
Portugal	0	4	1	5	2
Spain	1	13	8	22	10
UK	1	19	5	25	12
Total EU12	19	161	32	212	100

**Source:** As for Table 1

the most expensive projects. Other countries such as Belgium, the Netherlands and Greece, have much smaller defence budgets and are unwilling to pay for the privilege of sharing the development bill for new products. Rather, they prefer to 'buy' manufacturing jobs and technology for their domestic industry through licensed production. Italy falls between these two groups both in terms of the size of its defence budget and its preference between development and production work. Although there have been far fewer offsets than contracts involving the licensed production of foreign equipment, this instrument of industrial policy has been (and is) widely used throughout the EU and, according to Table 3, this is largely irrespective of the purchaser's technological capability.

Having examined which EU countries typically demand a work-sharing agreement for their equipment purchases, let us consider Table 4 which reveals those nations that have been the vendors in these sales. Not surprisingly, a large majority (69 per cent) of work-sharing deals involve the production of US-designed equipment; British French, and German equipment accounts for a further 22 per cent of work-sharing deals. The remaining 9 per cent of agreements relate to the purchase of equipment from 12 other countries. One other interesting point to note from Table 4 is that while US-designed products have accounted for over 73 per cent of the number of sales involving licensed production this figure falls to 28 per cent for offset sales. Of course, an analysis by

the value, rather than the number of sales, might offer a different picture but what evidence there is does suggest that as far as work-sharing deals are concerned, EU suppliers of final equipment are increasing their share of the market at the expense of US suppliers but they are also incurring a major share of offset commitments.

**Table 4:** EC Work-Sharing Contracts by Selling Country, 1950–89

Vendor	Number of Contracts				Total	(%)
	Licensed Production	Co-production	Offsets			
USA	118	18	9	145	68.4	
France	15	—	8	23	10.9	
UK	9	—	5	14	6.6	
FRG	6	—	4	10	4.7	
Others	13	1	6	20	9.4	
Total	161	19	32	212	100	

**Source:** As for Table 1

This overview of work-sharing associated with defence procurement has revealed a rapid growth of offsets in the 1980s and that this growth has involved the EU states as purchasers and, in some cases, as providers of defence equipment. It has, however, provided little insight into the economic arguments for offsets and it is to these that we now turn.

## 2.6 Offsets — Economic Motives

### 2.6.1 Oligopolies, second-best outcomes and capturing economic rent

Neoclassical economic theory stresses the advantages of exchanging money for goods through conventional markets. However, as mentioned above, purchases of aerospace goods provide multi-dimensional benefits (e.g. security, jobs, technology) that might not be amenable to a single efficiency criterion. Consequently, the establishment of a mutually satisfactory bargain might be enhanced if the dimensions of the bargaining problem are increased (e.g. price and offset terms). Typically, the marginal rates of substitution of the parties will differ across the various dimensions of the transaction and such differences can be exploited to their joint advantage. Moreover, the market for high technology

aerospace products is characterised by oligopoly and thus a rationale exists for bargaining to restore the flexibility of prices where they are not usually varied to meet changing market conditions. Furthermore, the existence of oligopolistic distortions could be cited to justify the use of industrial policy to achieve a second-best outcome or in an attempt to capture, for domestic citizens, some of the economic rent that such imperfect markets generate.

Economic rent is any payment to an input greater than the most it could earn in its next most lucrative use. In a competitive economy, the argument is that the existence of rent will attract new entrants and that any rent will be competed away. However, Krugman suggests that the existence of a steep learning curve might, for example, make entry look unprofitable yet existing firms might be enjoying abnormal profits. If these industries also happen to be important trading sectors, such as the aerospace industry, then there is a theoretical case for strategic government participation in an attempt to capture some of this rent for domestic citizens when purchasing foreign aerospace products.<sup>69</sup> However, the practical difficulties associated with the successful execution of such a policy are substantial (e.g. the promotion of the interests of one strategic sector might have an adverse effect on other sectors). Reviewing this literature, Udis and Maskus conclude that '... offsets have relatively limited usefulness as tools of strategic trade policy'.<sup>70</sup>

### 2.6.2 Technology transfer and spillovers

Often, governments seek the transfer of new technologies into the domestic economy, and offsets, where for example the vendor agrees to establish a local plant, do just this. Eventually, the new technologies will diffuse throughout the economy, stimulating economic growth. The economic justification for this form of government intervention is straightforward. An individual firm will purchase technology up to the point where marginal cost equals marginal benefit. However, because the technology ultimately diffuses throughout the economy, the benefits to society exceed the benefits to the firm. Thus individual firms under-invest in technology as, when formulating their investment levels, they ignore the benefits that accrue to others from their own investment decisions. Of course, this does not necessarily mean that offsets are the best way to acquire technology. However, Udis and Maskus suggest that offsets might be a more efficient way of acquiring technology than a straightforward purchase. Their argument is that with a direct purchase the buyer bears all the risks associated with the failure of the technology. When the technology transfer is part of a larger contract, however, this risk is shifted to the vendor who, in an attempt to protect his reputation, will have a greater incentive to transfer successfully the

technology for fear that failure will tarnish his reputation for the provision of the entire system.

### **2.6.3 The infant-industry argument**

Governments often want to enhance their defence industrial base to improve their military capabilities. Where learning and scale economies are important for unit production costs, a certain level of sales might be necessary to achieve international competitiveness. By encouraging foreign suppliers to place work with domestic manufacturers, in addition to that which would have occurred in the absence of the offset, the domestic government is in effect protecting this industry. However, the volume of work placed might be such that domestic industry becomes internationally competitive, moves down the learning curve and, once established, has no need for further protection.<sup>71</sup> Of course, to the extent that other countries have their own offset requirements, which might draw work away from domestic firms, then there will be a need for the initial exporter to be allowed to bank offset credits, once it has fulfilled its initial obligation, to encourage it to continue place work with domestic manufacturers.

### **2.6.4 Offsets as a form of market entry/overcoming protectionism**

The size of some domestic markets, such as that in the US, might generate sufficient competition among sub-contractors that primes feel no need to consider overseas suppliers. In this case, by forcing, say, US primes to consider UK suppliers, offsets help to get UK firms onto the bidders list. Of course, UK suppliers will only win contracts to the extent that they are competitive with their American rivals. In this instance, offsets can be interpreted as assisting the entry of UK firms into US markets and/or as reducing the protection that the size of the US market offers domestic sub-contractors against foreign competitors.<sup>72</sup>

### **2.6.5 Offsets as a form of employment and regional policy**

As happens in the market for technology, the divergence between private and social costs, and between private and social benefits, can also be used to justify government intervention in the labour market. If someone would otherwise be unemployed, then the social cost of hiring this person will be markedly less than the private cost (which is equal to the wage rate plus employer taxes). Consequently, from society's point of view, firms will employ too few people and thus a role emerges for government policy to offer the appropriate incentives (e.g. labour subsidies) to remedy this situation (although critics of this argument would point out that such subsidies have to be funded through higher

taxes, which reduces spending and thus employment in other areas of the economy). By encouraging foreign firms to buy more from, say, the domestic aerospace industry, government is effectively subsidizing employment in this sector. Similarly, some countries require a specific regional distribution of offset work and this is clearly a form of regional policy as it encourages firms to locate economic activity in specific geographical areas. Whether offsets are the most cost effective way of achieving these objectives remains a moot point but, in principle, it should be possible to compare the cost per offset-generated job with the cost per job through a regional employment subsidy.

## 2.7 Offsets — Political Objectives.

Procurement choices, particularly those involving large sums of taxpayers' money, are made in the political market place where various interest groups seek to influence decision-makers. In this situation, arguments about economic efficiency can be swamped or hijacked by those who want offsets to be used to reward favoured interest groups (e.g. a particular industry or region) by providing hidden subsidies to local firms.

Governments can also cite the alleged economic benefits of offsets as justification for spending large sums of taxpayers' money on foreign rather than domestic products. In this case though, offsets are trade creating, in the sense that they facilitate international transactions which would otherwise have been (politically) impossible. Once again, offsets help to overcome protectionist sentiment.

If the defence industrial base is relatively weak so that there is no indigenous capability, the alleged jobs and technology benefits of offsets might facilitate the purchase of defence equipment which would otherwise have been politically impossible, or if possible, at a much reduced level.

Offsets can also assist the establishment of a DIB which might be valued for the improved security of supply it offers, as well as reducing the support costs over the life of the system compared with the provision of such services by the original supplier.<sup>73</sup>

Finally, offsets might be used to reduce the adverse impact on the balance of payments of a large defence purchase, particularly where the purchaser is seeking to maintain a fixed exchange rate.<sup>74</sup>

## 2.8 Offsets — Empirical Overview

Before any evaluation of offsets can be made, basic information on the costs and benefits of these policies are essential. Unfortunately, this is rarely available

and, as a result, the economic literature on offsets is not particularly extensive. Moreover, that which does exist mirrors the literature on countertrade in the sense that it largely comprises papers which describe the various forms of offset, illustrate the growth of this form of reciprocity, and then discuss one or two deals in more depth. Rarely is there any evaluation of either how much the offset cost (compared with an off-the-shelf sale) or any quantitative estimate of the benefits forthcoming (e.g. in terms of the technology transferred, or the number of jobs generated).

One exception to this general rule is the fascinating series of reports published by the US Office of Management and Budget in the late 1980s. The US, of course, is largely an exporter of arms and thus it is not concerned with the cost premium that importers pay for offsets. Nevertheless, some Congressmen are concerned at the impact that offsets are having on American employment levels, the DIB, US international competitiveness and international trade. Consequently, before moving on to the country studies, the reader might find that the following summary of one OMB report provides some interesting background material.<sup>75</sup>

In the late summer and fall of 1988, the OMB sent a questionnaire on offsets in military exports to 52 of the top 100 DoD contractors. This mandatory survey covered all contracts signed over the eight-year period, 1980–87, and responses covered 90 per cent of all US military exports for the years 1980–85.<sup>76</sup> For the 8 years covered by the survey, contracts with offset agreements totalled \$34.8 billion and involved 30 countries. The offset agreements associated with these contracts were valued at \$19.9 billion, or 57 per cent of the value of the sales. The size of individual offsets varied considerably, from 5 to 175 per cent, with three countries (Spain, Switzerland and the UK) having an offset ratio greater than 100 per cent. Canada, Spain, EPG, UK, Turkey, Israel and Australia had all signed contracts that gave rise to offset commitments from US suppliers in excess of \$1 billion. The survey also found that for about one-half of the value of the offset obligations, the types of goods and services to be provided were not precisely defined at the time the contract was signed. Where mention was made of the types of goods to be purchased, most of the value was to be accounted for by manufactures, largely aircraft engines and engine parts, other aircraft parts and equipment, electronic components, and radar and related navigational equipment.<sup>77</sup> To implement their offset agreements, firms were allowed, on average, 11 years, although this period ranged from 6 years to 21 years. Hence only about 50 per cent of the offset obligations had been implemented by the end of 1987. Of these implementations, about 31 per cent were direct and 61 per cent indirect. Subcontractor production accounted for over 50 per cent of direct offsets while subcontractor production and countertrade accounted for almost all indirect

offsets. These implementations can also be disaggregated by the type of firm that fulfilled them. US prime contractors accounted for 60 per cent while US subcontractors accounted for another 37 per cent of these implementations.<sup>78</sup>

The Act requiring the production of the report specifically asked those responsible to consider the impact of offsets in military exports on defence preparedness, industrial competitiveness, employment, and international trade. As the OMB report points out:

'The greatest barrier to analysis of military offsets is the difficulty of determining an appropriate baseline for comparative analysis. Unless we have some idea of how affected industries would differ in the absence of offsets, it is difficult to answer any question along the lines of "How much higher (or lower) would exports (or employment, profits, etc.) be without offsets?"'.<sup>79</sup>

For example, if US companies ceased offering offsets whilst their competitors continued to do so, US firms might lose sales that they would otherwise have won. Even if the assumption is that US firms would still have won the contract, countries might be willing to spend more on foreign-designed defence goods accompanied with an offset, and that without such reciprocity, sales of US-designed defence goods would be lower and, in the case of NATO, its defence would be weaker.

### 2.8.1 Defence preparedness

The OMB report contends that by facilitating the sale of US equipment, offsets contribute to RSI within NATO. In addition, by enhancing the DIB of NATO members, offsets contribute to their ability to produce US systems overseas. Another indicator of the impact of offsets on defence preparedness is their impact on the principal sectors of the economy supporting national defence. Using data gathered in an earlier survey of US exports, the OMB found that defence export sales, net of their associated offsets, increased real output of the top 30 defence-related industries by over \$6 billion over the period 1980–84. Thus the report concludes that '... defence exports net of offsets provide economic benefits that strengthen US defence preparedness'.<sup>80</sup>

Of some Congressional concern is the impact of offsets on subcontractors. As the report points out, foreign sourcing can increase competition and thus lower defence costs. In addition, with aerospace as the largest component of defence, it might anticipated that if the DIB effects of offset were significant, then these would be apparent in the aerospace industry. However, the AIAA reports that all tiers of the industry continue to show this is a leading sector of the US economy, with a trade surplus of \$16 billion in 1987, whilst most other sectors show a trade deficit.

### 2.8.2 Industrial competitiveness

While the US trade balance has gone from a position of equilibrium in 1973 to a deficit of \$170 billion in 1987, the aerospace trade balance has improved from \$4 billion to \$16 billion. Thus offsets do not appear to have had an immediate and obvious negative impact on industrial competitiveness in this sector. However, co-production and licensed production can transfer technologies and establish new competitors, and the OMB reports that there is some evidence that sub-contracting has caused some firms not to expand or to contract their capacity. Nevertheless, without an offset, the US prime contractor might not have won the contract. The report suggests that while offset-related sales contribute to the marginal income of defence firms, the health of the industry depends primarily on US government purchases. In spite of substantial budget cuts in the early 1990s this is still likely to be true, although export sales might now be of more importance than they were in the 1980s.

### 2.8.3 Employment

The OMB report on the employment effect of offsets comes to the, perhaps somewhat counter-intuitive conclusion that, if anything, offsets increase domestic US employment opportunities compared with identical sales without any offset. The report assumes that the initial sale would have been made without the offset and it estimates, first, the employment effect of the sale *without the offset* and then the adverse employment effect of the offset. For offset implementations over the period 1980–84, the OMB puts the first figure at 89,750 employee-years and the latter at 28,400 employee-years. However, this is not the end of the matter. The report argues that ‘... there can be no foreign sales, over the long run, without “offsetting” purchases (imports), whether or not these purchases are linked directly to the sales as they are in the case of offsets’.<sup>81</sup> In other words, over the long run, the US trade balance must be zero. For the purpose of their report, the OMB assumes that imports equal exports over the five-year period 1980–84, and the authors calculate the employment impact of:

- a. the extra imports necessary to ensure that the value of the initial export equals the offset plus residual imports; and
- b. the imports necessary to match the export without the offset.

In this scenario, the net effect of the offset is to increase the number of employee-years of work for US industry by 1,372. Basically, those industries that lose sales because of offsets are less labour-intensive than those other industries whose products are imported to ensure that the trade balance is zero.

It is pointed out by the OMB that, although offsets have little effect on the level of employment, their inefficiency is reflected in their effect on the distribution of employment across industries. The report reveals that, relative to normal trade, offsets tend to shift workers from activities in which they have a comparative advantage to those where they have a comparative disadvantage.

## 2.9 Concluding Remarks

This chapter has provided an overview of countertrade theory and evidence. There has also been a discussion of the economic arguments for offsets and a summary of one of the very few detailed studies of their impact. Unavoidably, many of the themes that have already been identified will emerge again in the following chapters. Nevertheless, having absorbed this overview, the reader who is unfamiliar with the area should now be able to view each of the country studies within the wider context of the debate about offsets.

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