

Chapter 2

Countertrade Offsets in International Procurement: Theory and Evidence*

Travis K. Taylor

Introduction

International government procurement is rife with deviations from the perfectly competitive market model and arm's-length exchange. In the defense, aerospace, capital equipment, automotive, and telecommunications industries, for example, we encounter imperfectly competitive markets. The complexities of high transaction costs, incomplete and asymmetric information, and bounded rationality mark this exchange setting. In this environment, economic theory predicts that markets typically underproduce relative to the socially optimal level, and sellers frequently earn supernormal profits, rents, and quasi-rents.

Production is characterized by high start-up costs, fixed costs, and research and development (R&D) investments. The increasing returns associated with large-scale production runs make it critical to augment the domestic market with export sales. The mode of competition can vary among sellers in these markets by industry. Standard oligopoly models predict positive profits, though this need not always be the case. One can envision scenarios where two firms are the principal sellers of a product, and Bertrand competition ensues. In such circumstances, intense competition could drive price down to the perfectly competitive level with both firms earning economic profits equal to zero.

*This chapter was originally published in Thai, K. (ed.), *New Horizons in Public Procurement* (2011), PrAcademics Press, Florida USA. The editors are grateful to PrAcademics Press for their cooperation and reprint authorization. The author gratefully acknowledges funding support from a Christopher Newport University research grant. Mr. Andrew Winters provided excellent research assistance. The author also thanks three referees who provided valuable comments and suggestions. Any remaining errors are, of course, the sole responsibility of the author.

T.K. Taylor (✉)

Christopher Newport University, Newport News, VA, USA

e-mail: ttaylor@cnu.edu

For example, consider the world market for surface-to-air missile-defense systems. Raytheon (US) produces the Patriot missile, and the Russian firm Almaz makes the S-300. In the absence of collusion, Bertrand competition may ensue. To avoid an all out price war, the firms may attempt to influence the terms of trade beyond the standard price margin. Bribery, favoritism, and other dubious measures are illegal and thus discouraged. Barter, countertrade, and offset contracts are legal to varying degrees. These procurement policies can be understood as marketing strategies to differentiate the oligopolists' goods. As we analyze the demand side of these transactions, we find that countertrade offsets are attractive for a variety of perceived and real benefits. In instances when the arrangement matches sellers with previously unknown buyers and input providers, production and transaction costs can be reduced (Taylor 2005). Others (Brauer 2004; Taylor 2004; Martin 1996) note that procurement-induced countertrade can foster technology transfer, conservation of foreign exchange, market penetration, foreign investment, training and services, and more.¹

In this chapter, we examine the rationale for nonstandard contracting in international procurement. Long viewed as trade diverting and inefficient, we assess the benefits and costs of countertrade offsets and explain their very existence in section one. Section two provides a legal context including the governing statutes of the World Trade Organization (WTO), European Union (EU), and the US government. In the third section, we focus on the transaction costs of monitoring the contracts, *ex post*. This section notes that measurement costs range from negligible to significant and monitoring regimes need to adapt accordingly. We evaluate the settings in which input metrics, output metrics, and some combination of the two are advisable. The final section of the chapter reports several empirical findings drawn from a new countertrade database.

Theoretical Rationale for Countertrade Offsets in Procurement

An offset agreement is a contract between a purchasing government and a foreign supplier. As a condition for the sale of goods or services (the "base good"), the foreign firm is encouraged or even required to provide additional economic benefits – beyond the base transaction – to the purchasing government's economy. These benefits can take the form of countertrade, industrial compensation packages, investment, technology transfer, subcontracting, and so forth. In essence, the offset inserts a degree of reciprocity in the transaction. The perceived benefits of procurement countertrade, while politically attractive, are difficult to verify empirically. First, the benefits of the

¹ According to the *U.S. Presidential Commission on Offsets* (2001, p. 32), seven of eight large American aerospace firms reported that they would lose 50–90% of their export sales if offsets were not included in the deal.

offset must be distinguished from economic activity that may have occurred naturally in the absence of the intervention. This requirement is known as additionality.² Second, the benefits accrue over a long period, rather than a lump sum monetary transfer. According to the U.S. Commerce Department's annual *Offsets in Defense Trade* (2007), the average time to fulfill the offset obligation is approximately 7.5 years. This duration of time makes net benefit calculations more difficult and unreliable – though certainly still useful. Assumptions about the depreciation of core capabilities, technology, and other time-sensitive assets require codification to maintain best practices.

Third, the purchasing government needs to compute the economic cost of the offset arrangement, which is no easy task. Economic costs include the opportunity cost of resources that are redirected toward the offset, as well as the additional variable and fixed costs to fulfill the offset. The extra variable and fixed costs are usually passed on to the buyer – at least partially – in the form of a higher price of the base good.³

In short, there is much skepticism in the literature whether offset arrangements, on balance, show positive net benefits for a country.⁴ In one of the few economic audits ever performed and released to the public, PriceWaterhouseCoopers (PWC) was hired to perform an independent study of several representative offset agreements signed by the government of the Netherlands (Countertrade and Offset 2003). Though the purchase price increased nominally on average, the net benefits were positive. Such studies are important and ought to become common practice.

Another set of questions emerges when governments elect to forego price discounts and instead opt for countertrade arrangements in procurement. In government procurement markets, there are typically a relatively small number of buyers, each possessing significant purchasing power. In industries such as information technology, aerospace, telecommunications, and defense, we note a highly concentrated market structure. The combination of few buyers and few sellers creates a bilateral oligopsony market structure that induces bargaining and a wide range of transaction prices, particularly when pricing data are proprietary and seldom released.⁵

Most interesting – and troubling to many at first blush – is the request for in-kind transfers in lieu of price discounts. In Arrow and Debreu markets competitive forces create an equilibrium price that equals the marginal cost and long run

² To fulfill offset obligations, most sellers are asked to demonstrate additionality and conditionality. Additionality refers to new economic activity that was transferred from the seller to the purchasing government's economy, above any activity that may have occurred in free marketplace. A related term is conditionality, which connotes the reciprocal exchange among multiple firms.

³ This practice is known as "price padding." Taylor (2005) and PriceWaterhouseCoopers (Countertrade and Offset 2003) estimate that price padding ranges from 3 to 5% of the original purchase price.

⁴ See Brauer (2004), for a discussion of offset audits.

⁵ If the firm can withhold pricing data in a highly concentrated market, it may be able to price discriminate and increase profits.

average cost of production.⁶ Competition ensures the lowest possible price, while bargaining and its associated transaction costs are assumed to be negligible or zero. As we move toward imperfectly competitive markets, economic models predict economic rents for sellers and discounted prices for large buyers. Depending on the extent of market power, the purchasing government may negotiate discounts that extract rents from the seller. Why, then, do purchasing governments opt for in-kind transfer instead of cash? Several compelling theories have been offered in the literature. Hall and Markowski (1994, 2004) and Taylor (2004) examine two broad categories: (1) neoclassical cost minimization, and (2) the capabilities theory of the firm.

Hall and Markowski (1994) note that procurement of large-scale, high technology products such as weapons systems, aerospace, and information technology typically involves thousands of complementary products. For example, when Northrup Grumman sells its aircraft carriers, it also offers related items such as “acquisition management services,” “acquisition support,” “active tracker laser,” and the “LN-120G Stellar-Inertial Navigation System” that are typically purchased as well.⁷ In short, international government procurement is seldom the stand-alone, turnkey variety. To operate properly, systems require significant training, maintenance, and service after the sale.

As a result, bundling complementary products together may be Pareto-efficient for all parties. When the seller bundles offset work with the base good (the aircraft carrier in the example above), it may achieve economies of scale and scope.⁸ However, offset demands that are outside of the seller’s core capabilities may extend the boundary of the firm and subject it to diseconomies of scope. Poorly conceived countertrade agreements and indirect offsets are most likely to suffer from these diseconomies and increased transaction costs.

The potential for consumption economies also exists. For example, if Spain were to purchase a nuclear submarine from Northrop Grumman, tremendous cost savings can accrue if Spain uses the same firm to build the accompanying dock, provide maintenance, and *ex post* service. Rather than working with multiple firms and signing numerous contracts, the buyer can exploit the complementarities in consumption and reduce transaction costs by signing a multiyear offset agreement. Probably the most important aspect of this arrangement, however, is that the buyer extracts rents while also augmenting its capabilities. Evidently, the procurement via countertrade is perceived to be more successful in this regard than arm’s-length exchange in markets.

⁶ Arrow and Debreu (1954) markets are characterized by many buyers and many sellers, no barriers to entry, product homogeneity, marginal cost pricing, and complete information.

⁷ See <http://www.atoz.northropgrumman.com/Automated/AtoZ/L.html>.

⁸ Economies of scale occur when long run average cost per unit declines as more is produced. Mathematically, economies of scale is given by $\partial LRAC / \partial Q < 0$. Economies of scope are achieved when the cost of producing two different products together is less than the cost of producing them separately ($C(y_1, y_2) < C(y_1) + C(y_2)$), where C is total cost, y_1 is the output of product 1 and y_2 is the output of product 2.

Purchasing governments may elect to leave the price margin for several reasons grounded in the economics of organization literature. First, offsets can be designed to safeguard the base good when the seller is required to post an economic hostage (Williamson 1983; Hennart 1989). For example, one technique is to sign a coproduction or subcontracting agreement whereby the seller is responsible for collaborating with a domestic firm in the purchasing government's economy. The requirement is to produce inputs that are then sold back to the seller and used in the base good's production function. Inasmuch as the offset creates incentive for the seller to teach local firms best practices and cost-minimizing techniques, incentives are better aligned. This countertrade strategy is particularly valuable in cases where the base good embodies tacit knowledge and high technological intensity in production (Penrose 1959).

Second, the offset may serve as the carrot needed to induce a multinational firm to sell, market, teach, advise, or invest in a third country. To be clear, the seller is unlikely to give away its core capabilities and in many instances the American Bureau of Export Administration at the Commerce Department makes it illegal to transfer certain products to select countries and end-users. Nevertheless, there is anecdotal evidence that purchasing governments are able to assist domestic firms in obtaining goods and services that would otherwise not be forthcoming in free markets.⁹ Ultimately, we return to the basic notion of the "make-or-buy" decision. Is it more efficient for a government to purchase a product off-the-shelf in free markets, or use its leverage to induce domestic production via countertrade and offsets? This is not an easy question to answer, especially because of the intertemporal dynamics involved. Competencies and comparative advantages are not static; they are dynamic and can be learned. The challenge is to determine which method is most efficient to obtain the desired results.

Legal Framework

The Agreement on Government Procurement (GPA) of the WTO Uruguay round (1994) addresses the issues of international procurement, countertrade, and offsets. Article XVI sets forth the official WTO position on offsets:

- Entities shall not, in the qualification and selection of suppliers, products, or services, or in the evaluation of tenders and award of contracts, impose, seek, or consider offsets.
- Nevertheless, having regard to general policy considerations, including those relating to development, a developing country may at the time of accession negotiate conditions for the use of offsets, such as requirements for the incorporation of domestic content. Such requirements shall be used only for

⁹ Interviews with U.S. Commerce Department and Malaysian Ministry of Finance, 1998.

qualification to participate in the procurement process and not as criteria for awarding contracts. Conditions shall be objective, clearly defined, and nondiscriminatory.

Article XVI is a plurilateral agreement, thus members are encouraged but not required to be a signatory to it. In 2010, 40 of the 153 WTO members are signatories to this agreement (World Trade Organization 2010). Broad consensus exists for free market competition and transparency of procurement policies.¹⁰ Article XVI reflects this consensus by prohibiting countertrade requirements like offsets in civil procurement.

Several important exceptions to competition and transparency exist, however. First, developing countries are encouraged but not required to abide by this agreement.¹¹

Article V: special and differential treatment for developing countries

Objectives

1. Parties shall, in the implementation and administration of this Agreement, through the provisions set out in this Article, duly take into account the development, financial and trade needs of developing countries, in particular least-developed countries, in their need to
 - (a) Safeguard their balance-of-payments position and ensure a level of reserves adequate for the implementation of programmes of economic development
 - (b) Promote the establishment or development of domestic industries including the development of small-scale and cottage industries in rural or backward areas; and economic development of other sectors of the economy
 - (c) Support industrial units so long as they are wholly or substantially dependent on government procurement
 - (d) Encourage their economic development through regional or global arrangements among developing countries presented to the Ministerial Conference of the World Trade Organization (hereafter referred to as the “WTO”) and not disapproved by it
-

The rationale for exempting developing countries is akin to that of the infant industry protection theory. According to this theory, developing countries are home to a preponderance of new and inefficient firms. These firms have relatively high average costs of production relative to established multinational enterprises (MNEs) from industrialized countries. If these “infant” firms are forced to compete on the

¹⁰ Linarelli (2003) details the WTO transparency agenda, and the endemic political and economic challenges that can stunt progress. Trionfetti (2003) reviews the theoretical literature and concludes that home-biased procurement can be trade-diverting (and output reducing) under monopolistic competition. Although the author does not address offset agreements, some types of countertrade contracts in procurement appear to fall in this category as well. On the other hand, some offset contracts can be shown (Taylor 2005) to lower unit costs, increase trade, and improve welfare. The wide variation of countertrade arrangements, then, limits the applicability of Trionfetti’s (2003) findings to select settings.

¹¹ The exception in Article V is based on political and economic considerations. To achieve sufficient “buy-in” from a heterogeneous population of member countries, the exemptions in Article V proved necessary in the domestic political discourse. Moreover, economic development theory is far from conclusive in regard to the growth strategy for developing countries.

same platform as the MNEs in the GPA, they will invariably lose most of the time. Suppose, alternatively, that the government applies a temporary tariff on foreign imports of the industry in question. Proponents of this theory (Chang 2008; Reinert 2007) argue that when new firms have sufficient time to learn, innovate, and process tacit knowledge associated with the production process, average costs will fall and protection is removed as the “grown up” firm emerges. Although the economics literature is generally skeptical toward any purported net benefits of this policy, the theory (and policy) is attractive due to its perceived simplicity, logic, and political appeal (Baldwin 1969; Succar 1987).

A second set of exemptions from Article XVI concerns national security and public health. Defense purchases ranging from small arms and radars, to tanks and multibillion dollar weapons systems may include countertrade and offset requirements. Notably, this exemption applies to all countries.¹² As the reader may gather, an exemption for national security is so wide in scope that procurement officers can employ offset arrangements at their discretion. A similar exemption may be invoked when governments purchase goods and services for public health. To date, the vast majority of exemptions to Article XVI have come from defense procurement.

The European and American procurement policies complement the WTO's GPA. The European policy on defense procurement is codified in Article 296 of the EU's Economic Community (EC) treaty. Article 296 outlines a national security exemption that is consistent with Article XVI of the GPA. European governments have historically used countertrade and offsets to promote select industries and technologies in the defense industrial base (DIB). Recent discussions between Europe's G-6 and the US government signal a possible procurement policy shift toward less reliance on offsets. A 2009 white paper (“European Code of Conduct”) from the European Defence Agency aims to develop a multilateral consensus on ways in which procurement offices can design offsets that support sustainable economic growth and limit adverse effects. Although the U.S. Inter Agency Working Group (IAWG) has clearly been the catalyst for these discussions, the Europeans have been willing to broach the topic far more than in the past. For instance, a new regulation in the EU will significantly limit the scope of activities that may be used to fulfill offset obligations. The European Defence Procurement Directive “targets indirect non-military offsets, with the aim of eliminating them” (U.S. Department of Commerce 2009, p. 52).

The US government rejects any claims that countertrade and offsets in procurement can yield positive net benefits. The official US policy is that countertrade and agreements are trade-diverting and inefficient. The government neither requires nor accepts offsets from foreign MNEs in RFPs and bid evaluations.¹³ Furthermore, since

¹² Offsets may be included in the RFP, but they cannot be the determining factor in bid evaluation.

¹³ An argument can be made that when the US government invokes the “Buy America” clause in many defense procurement transactions, the level of protection and trade-diversion far exceeds that of an offset or a related countertrade instrument.

Table 2.1 Summary of US defense offset arrangements, 1996–2008 (in \$ millions)

Year	US companies	Agreements	Base export value ^a (\$)	Offset value (\$)	Offset ratio ^b %	Countries
1996	16	53	3,119.7	2,431.6	77.9	19
1997	15	60	5,925.5	3,825.5	64.6	20
1998	12	41	3,029.2	1,768.2	58.4	17
1999	10	45	5,656.6	3,456.9	61.1	11
2000	10	43	6,576.2	5,704.8	86.7	16
2001	11	34	7,017.3	5,460.9	77.8	13
2002	12	41	7,406.2	6,094.8	82.3	17
2003	11	32	7,293.1	9,110.4	124.9	13
2004	14	40	4,927.5	4,329.7	87.9	18
2005	8	25	2,259.8	1,464.1	64.7	18
2006	12	44	4,832.4	3,425.3	70.8	20
2007	10	43	6,735.7	5,437.5	80.7	18
2008	14	52	6,096.1	3,480.6	57.1	17

^aBase export value is the summation of US sales to countries that require offsets

^bOffset ratio is the compensation ratio defined as (offset value/base export value)

Source: U.S. Department of Commerce (2009, p. 5)

the Duncan Memorandum of 1978 the US government has (wisely) refused to guarantee any offset obligations that American firms owe to foreign countries. The government is, however, keenly aware that American firms dominate the very industries that are rife with countertrade and offset requirements. During the period of 1993–2008, 48 American firms signed 677 offset agreements worth \$68.93 billion (U.S. Department of Commerce 2009, p. 4). In 2008 alone, 14 US companies entered into 52 offset agreements in support of \$6.09 billion in export sales. Table 2.1 summarizes offset arrangements signed by US defense firms between 1996 and 2008.

The nominal value of offset obligations is a concern for the US government and the MNEs involved. As the nominal value rises relative to the value of the base sale, the long run profitability of MNE declines. During the last 15 years, the compensation ratio for American firms that signed offset agreements is 70.96% (U.S. Department of Commerce 2009, p. 5).¹⁴ Thus, on average, every \$1 in export sales in these markets is supported by about 71 cents in economic benefits returned to the purchasing country. These data are a bit misleading, however, because the offset fulfillment is usually spread over a 5–10-year period. In addition, Taylor (2005) shows that in imperfectly competitive markets with incomplete information, the offset can actually lower the MNEs' average cost of production under certain circumstances.

The government is also worried about the potential damage to second- and third-tier manufacturing firms due to countertrade and offset requirements. When the MNE ("prime contractor") fulfills its offset obligation by substituting a foreign input supplier

¹⁴ The compensation ratio is defined as the dollar value of offset obligations divided by the dollar value of export sales supported by the agreement.

		Firm 2	
		High Valued Package	Low Valued Package
Firm 1	High Valued Package	1, 1	3, 0
	Low Valued Package	0, 3	2, 2

Fig. 2.1 Simple prisoner's dilemma game of offset provisions

for a domestic firm previously integrated in the supply chain, lower and mid-tier deindustrialization could occur. Empirical evaluation of this potential substitution effect is sparse and inconclusive.¹⁵ The general equilibrium effects are ambiguous.

To address these and other concerns about offsets in government procurement, the IAWG was formed in 2004. The IAWG, which is comprised of officials from Commerce, Defense, and State is charged with engaging other offset-providing country governments to limit the growth of offsets. The IAWG also seeks to lessen the importance of offsets in bid evaluation, and promote increased flexibility toward offset fulfillment among purchasing governments. Meetings have been held with European counterparts, and policy coordination remains a remote possibility in the future.

Policy coordination in these markets will likely prove difficult. A stylized example can illustrate the resistance to policy coordination in a sealed bid, simultaneous game setting. Firms and governments operate in a bilateral oligopsony market structure. A handful of large firms – primarily from the US and Europe – compete for the business of a relatively small number of purchasing governments. In this simplified case, assume that the primary (base) goods (from the RFP) offered by the MNEs are homogenous and priced identically. The market structure is such that a prisoner's dilemma-style game could ensue. If all MNEs could coordinate their actions and offer a small offset package, joint profit in the industry would rise. Another scenario is that firm 1 offers a higher-valued offset package than firm 2, *ceteris paribus*, and firm 1 wins the contract. If the firms exhibit similar cost functions, symmetry will exist when firm 2 offers the higher-valued package and wins the contract. Consequently, both (or all in the n player game) firms will offer the higher-valued packages in the Nash equilibrium and earn lower profits. The IAWG, then, seeks to coordinate efforts – perhaps establishing trust among supplier countries – and achieve a cooperative equilibrium. Figure 2.1 depicts the

¹⁵ The U.S. Department of Commerce (2010) *Offsets in Defense Trade* attempts to quantify this substitution effect. Unfortunately, the methodology is flawed and the results cannot be accepted.

simple game. The numbers inside the cells represent the possible monetary payoffs (e.g., in millions) for the firms under each scenario.

Assessing Performance: Metrics

Ex post monitoring and contract evaluation are critical if we are to ascertain the effectiveness of a given transaction. To date, it must be acknowledged that most government attempts to monitor offset performance have been unrefined and imprecise at best, inaccurate and corrupt at worst. How can a government accurately measure performance of this policy instrument? We might start with the two most common metrics in human resource evaluation: inputs and outputs.

Input Metrics

An offset can be written as a function of capital, labor, technology, and other resources: Offset Contract Benefits = $(K, L, \text{technology}, u_t)$. The contract calls for a given work or economic benefit to transfer to the purchasing government's economy; u_t is the *portmanteau* variable that includes political, security, and economic development considerations. The valuation of capital and labor is straightforward, as their original costs and current market values are readily available. The value of technology transfer and tacit information is more difficult to quantify. In these markets, asymmetric information and uncertainty create circumstances where buyers know less about product attributes, cost, and future utility than sellers (who themselves are not impervious to uncertainty). These information problems can raise transaction costs, induce opportunism on the part of the seller, and generally distort the evaluation metrics.¹⁶ Legal recourse is unattractive in the international marketplace because enforcement tends to be costly, and outcomes are highly uncertain. Williamson (1983) argues that in the absence of court action, firms employ private-ordered contracts to safeguard the exchange and minimize *ex post* measurement costs.

Consider an offset contract that requires the seller to transfer a specified technology to the purchasing government's economy. In 2007, for example, the Polish military purchased €110 million worth of surface-to-air missiles from the Swedish firm SAAB (Countertrade and Offset 2007). The offset arrangement required SAAB to transfer related technology to select Polish firms. After the original exchange is consummated, safeguards are needed to support offset fulfillment in the presence of moral hazard, asymmetric information, and tacit knowledge. Measurement costs rise if Polish officials use input proxies such as billable hours or number of trainees supervised;

¹⁶ See Taylor (2005) for a transaction cost approach to procurement offsets and countertrade.

officials would still need to determine if the technology transfer met program goals. Furthermore, in professional and creative works, it is difficult to ascertain whether the individual is shirking or on the verge of a brilliant innovation (Fama 1991). Exchange settings marked by high transaction costs, opportunism, and imperfect information are monitored more efficiently by the adoption of output metrics.

Output Metrics

Countertrade offsets are designed to transfer economic benefits to the purchasing government's economy. Theoretically, assessing the performance of work ought to be measured by observation of the final product. One can observe a properly functioning automobile plant, shipping company, or a sugar refining company and their respective outputs. One can compute the economic value added (EVA) by summing the jobs created (and associated wages), and the revenue generated from domestic and export sales. In the aforementioned examples, we can calculate a reasonably precise estimate of net benefits and EVA. Though this method requires more sophisticated accounting and economic analysis, it is probably the best approach to evaluate the performance of a sizeable offset contract.

This method uses accounting, market prices, observable sales, and cost data to verify the success (profit) or failure (losses) of the contract. Of course, the underlying assumption of this approach is that (short run) profits signify relative success of the deal, and losses or negative economic value imply the operation underperformed or failed. Today, several countries monitor offset fulfillment with the EVA approach. The United Arab Emirates (UAE), headed by Dr. Amin El-Din, pioneered its use in the late 1990s.

Ideally, the measurement of performance would include a mix of input and output metrics. Why not focus exclusively on outputs to determine EVA to an economy? For the reason it pays to foster select public-private partnerships, nonprofit organizations, and government provision of public goods. These projects frequently fail the initial expected rate of return and profitability tests, and might be construed as underperforming or failed projects. However, losses and negative benefit-cost ratios are common for new firms in emerging industries. Additionally, lumpy public investments may yield positive profits in the long run – but not the short run – as the firms' average total costs decline, learning-by-doing occurs, and product demand reaches a critical level to exploit scale economies.

Nonprofit, educational, and environmentally based offsets may never register positive profits but could still contribute to the purchasing government's economy in a favorable way. For example, a sale of helicopters (Eurocopter) to Kuwait required the European firm, EADS, to make educational investments and provide training in the country (Countertrade and Offset 2004). Strict adherence to financial variables to determine the longer term value of such a project is problematic. Therefore, exclusive reliance on an output metric – akin to the UAE approach – to judge the effectiveness or performance of an offset is not advised. Likewise,

narrow application of input metrics can be misleading because the offset provider has incentive to substitute quantity for quality. This behavior may take the form of perfunctory efforts to merely “get the job done,” or the intended use of less skilled workers or the “second team.” Suppliers might try to cut costs in the provision of inputs, with little incentive to teach routines and “tricks of the trade” that ensure best practices and long-term success. A linear combination of input and output metrics would minimize the aforementioned shortcomings. A sliding scale could be employed to select the optimal input–output metric for the product and industry in question. For example, if the objective is to develop new export markets for local firms, a counterpurchase offset could be combined with management and marketing training services. These activities can be specified in a contract with input metrics. It is straightforward to compute the value of the countertrade and verify the efficacy of training services with assessment and assurance of learning methods.

If the objective is to foster the transfer of technology and capabilities, a linear combination of input and output metrics minimize transaction costs and the potential for opportunism on the part of the seller. To measure input performance, the purchasing government could track labor hours devoted to training programs for domestic workers, estimate the supply cost of the technology transferred, billable consulting hours, and so forth. Clearly, these input metrics are only weakly tied to overall performance of the offset. In these instances, successful outcomes require the transfer of tacit knowledge. If the government relies solely on input metrics, the seller has incentive to act opportunistically by substituting quantity for quality while guarding core capabilities. Output metrics could help to align the incentive structure of the transacting parties, and promote best practices. In this case, the output metric can include any of the following variables: net income data after a designated period, quantity of output that meets or surpasses a given level of quality control, EVA thresholds in the purchasing government’s economy, return on investment, benefit–cost thresholds, and so forth.¹⁷

Results

The U.S. Commerce Department has compiled offset data since 1993. However, these data are limited to transactions involving American MNEs. Furthermore, American firms are only required to self-report if the value of the offset obligation exceeds \$5 million. The database is presented in aggregate form only, which severely restricts its use in microeconomic analysis. Consequently, the US database – while useful in evaluating trends and macroeconomic effects in the defense industry – lacks

¹⁷ Jang and Joung (2008) describe the economic value-added (EVA) method applied to defense procurement and countertrade offsets. The EVA integrates the (1) cost, (2) income, (3) lines of code, and (4) case studies methods to provide an objective and credible offset valuation model.

Table 2.2 Industrial classification of the base product

Industry	% of total
Aerospace	48.51
Automotive	9.90
Communications	4.95
Electronics	4.46
Energy	1.49
Environment	0.50
Financial	0.50
Industrial	1.98
Marine	10.89
Mining	0.50
Munitions	9.41
Specialty metals	0.50
Transportation	6.44

Source for Tables 2.2–2.7: author calculations derived from *Countertrade and offset* archives (2003–2007). The totals may not equal 100 due to rounding

the breadth and transaction-level detail required to study the governance structures of the international market.

To address these shortcomings, a database of international government procurement was constructed. The data were gathered from the archives of the most comprehensive trade journal in the field reporting on countertrade transactions.¹⁸ The database comprises 235 international public procurement transactions from 2003 to 2007. Data for the following variables were entered for each transaction, subject to vetting, and double-blind review to ensure accuracy: *MNE supplier, purchasing country, base product, base good industry, price of the base good, monetary value of the offset, offset type, intended offset project, offset recipient firms, time to completion, penalties*. As is typical of this kind of research, in some instances an observation was discarded due to missing data. While the research is ongoing at this stage, we can report several important findings.

Table 2.2 shows the industrial classification of the base good exchanged. These data confirm anecdotal evidence that countertrade offsets arise in imperfectly competitive markets. The aerospace industry generates the most offset transactions. Among the observations, sales of a base good from the aerospace (defense and civil) industry were responsible for an astounding 48.51% of the total. The marine (10.8%), automotive (9.9%), munitions (9.41%), and transportation (6.44%) industries are also well represented. In the aggregate, these five industries

¹⁸ *Countertrade & Offset* was founded in 1983. It specializes in global intelligence and reporting of structured finance and countertrade contracts worldwide.

Table 2.3 Type of offset contract in relation to the base good

Type	% of total
Direct	52.94
Direct and indirect composite	36.27
Indirect	10.78

accounted for 85% of the contracts that had accompanying offset obligations. These data are consistent with the US government's survey of offset-supplying firms. The results also support the theoretical claim that offsets are only appropriate under highly stylized exchange settings – namely, imperfectly competitive markets with super-normal profits, asymmetric and incomplete information, bounded rationality, and reputational economies (Taylor 2004).

Tables 2.3–2.5 focus on offset fulfillment and should not be viewed in isolation. Table 2.3 classifies the transaction according to offset type. A direct offset requires the seller to provide economic benefits to the purchasing government's country that are related to the base good. This may entail significant coproduction work, maintenance and repairs, or a simple subcontract agreement to supply the tires of an advanced aircraft. Indirect offsets are not related to the base good, and may run the gamut from technology transfer and training, to investment. The third classification is the composite case where a contract calls for both direct and indirect offsets. More than 50% of the transactions called for direct offsets, and another 28% included both direct and indirect work. Somewhat surprisingly, pure indirect offsets lagged far behind. There are economic and methodological reasons for this result. In procurement among industrialized countries, direct offsets are preferable because the purchasing country already has a diversified economy and the counter-trade is used to maintain or stimulate the DIB. In this exchange setting, direct offsets can facilitate the acquisition of core and ancillary capabilities more efficiently than indirects.¹⁹ We should also note that the *Direct & Indirect Composite* classification masks the use of indirects. We are unable to determine the extent to which a direct/indirect observation is shared equally, or dominated by a direct or indirect project. This is clearly a limitation of the data.

Tables 2.4 and 2.5 delineate the industry and organizational form of the offset fulfillment. Unsurprisingly, the industries that dominated the export sales of the base good were largely the same industries targeted for offset fulfillment. Offset obligations were most often fulfilled in aerospace (41.74%), automotive (8.7%), transportation (8.7%), marine (6.96%), industrial (6.09%), and munitions (5.22%). These data are consistent with the heavy use of direct offsets, the significant presence of defense contracts in the database, and the general aim to preserve country DIBs whether it be efficient to do so or not. Table 2.5 reports the class of offset fulfillment. These data can shed light on the economic organization of the firms, and the means by which the contract can be safeguarded. Coproduction/local

¹⁹ Furthermore, as discussed earlier, the WTO and EU procurement laws favor direct offsets.

Table 2.4 Industry for fulfillment of the offset contract

Industry	% of total
Aerospace	41.74
Agriculture	0.87
Automotive	8.70
Communications	4.35
Electronics	2.61
Energy	3.48
Environment	0.00
Financial	2.61
Forestry	0.87
Industrial	6.09
Marine	6.96
Medical	2.61
Mining	1.74
Munitions	5.22
Social development	0.87
Software	0.87
Specialty metals	0.87
Tourism	0.87
Transportation	8.70

Table 2.5 Organizational form of the offset fulfillment

Organizational form (class)	% of total
Coproduction/licensed production	30.95
Construction and infrastructure	9.52
Countertrade/buyback/barter	4.76
Finance and investment	9.52
Miscellaneous	0.79
Subcontracting	20.63
Technology transfer	23.81

production/local assembly was the most common class of fulfillment (30.95%), followed by technology transfer (23.81%) and subcontracting (20.63%). Again, these results are consistent with the leveraging of direct offsets, maintenance of the DIB, and capabilities acquisition strategies. Interestingly, buyback and barter (countertrade) agreements accounted for only 4.76% of the total, a notable change from past decades. And while counterpurchase agreements are still prevalent, it is clear that buyback and barter have fallen out of favor with purchasing governments. Historically, buyback and barter arrangements were most commonly used to conserve foreign exchange, or establish a credible commitment (reciprocity) to support the transaction. In the current global economy, conservation of hard currency is not a driving force in international public procurement.

Instead, these contracts can be seen as a means of developing trust and aligning incentives through reciprocal exchange (Taylor 2005). Counterpurchase agreements are also more flexible in that they need not be tied to the base good. It follows, then, that indirect offsets coupled with counterpurchase fulfillment is

Table 2.6 Geographic region of manufacturing supplier

Region	% of total
North America	29.65
South America	0.44
Europe	52.65
Eurasia	6.19
Middle East	7.96
Asia	3.10

Table 2.7 Headquarter country of the manufacturing supplier

Country	% of total
Austria	0.9
Belgium	0.4
Brazil	0.9
Canada	1.3
China	1.8
Finland	2.2
France	17.3
Germany	4.4
Israel	7.5
Italy	6.2
Japan	0.9
Netherlands	0.9
Norway	0.4
Russia	5.8
South Korea	0.4
Spain	4.4
Sweden	4.0
Switzerland	1.3
Turkey	0.4
Ukraine	0.4
United Kingdom	9.7
United States	28.3

more common in developing countries that pursue economic diversification rather than DIB investments.

Tables 2.6 and 2.7 reveal the origins of the offset-supplying firms. In these industries, the markets are dominated by (largely) American and European MNEs. Table 2.6 delineates the region of the supplier (MNE). As expected, Europe (52.7%) and North America (29.6%) account for the lion's share of the export transactions.²⁰ The discrepancy between Europe and North America can be explained, at least partly, by noting that there are a higher number of European firms in the database. Moreover, the median European firm is smaller (in sales and

²⁰ This comparison tracks base good transactions, not export revenues.

net income per annum) than the North American firm. If we had tracked supplier export sales revenues instead of transactions, the difference between the two regions would likely narrow. Unfortunately, these data are not available.

Perhaps, most striking is the paucity of transactions from the Asian (3.1%) and South American (0.4%) regions.²¹ Clearly, this speaks to the relative market shares of firms competing in these industries. Table 2.7 confirms that most of the successful firms in these oligopoly markets are from the US (28.3%), France (17.3%), and the UK (9.7%). Several characteristics are present in most of these markets. First, industries like aerospace, defense, transportation, and telecommunications are marked by high start-up costs and capital-intensive production processes. Second, natural and legal barriers to entry make it difficult for competitors to join the market. Third, significant economies of scale and learning curve effects exist, thereby putting laggards at a competitive disadvantage. Nevertheless, we should expect a gradual increase in supplier activity from select East Asian countries moving forward. South Korean, Japanese, and Chinese firms are rapidly developing the core capabilities necessary to compete in at least some of these markets. The so-called BRIC countries – Brazil, Russia, India, and China – but particularly Russia (5.8%) will likely become more active in the years to come as their governments continue to implement development strategies that target high value-added industry.

Conclusion

Countertrade offsets are the hybrid offspring of economic, political, and security considerations. In recent years, many countries have used offsets as industrial policy to further economic development objectives. The specific features of the contract reflect these objectives and also the degree of exchange hazard posed by the setting. A procurement policy matrix, then, can illustrate the tradeoffs between markets and hierarchies under different exchange settings, and offer some general guidelines to government officials.²² It is therefore inaccurate to conclude – as some researchers have – that countertrade offsets are strictly inefficient, or strictly beneficial. Both of these views fail to consider the full menu of policy responses that are appropriate for a given exchange setting. For example, the existence of any of the following variables may alter the exchange setting and thus the policy response: the potential for seller opportunism, the potential for strategic alliances, the level of competition and concentration within the industry, capital–labor ratios, and the existence of external economies and increasing returns.

²¹ Interestingly, 8.2% of transactions originated from the Middle East. The Middle East is a net importer of these goods and the associated offsets. The majority of these imports are defense procurement. Israel is largely responsible for the Middle East export transactions in the database.

²² Taylor (2004) develops a procurement policy matrix that considers transaction costs, capabilities of the firm, and production economies.

In this chapter, we set out to further our understanding of countertrade agreements in international public procurement. The theoretical portion of the chapter revisited the *raison d'être* of these agreements. We showed that under certain circumstances, both buyer and seller can achieve a Pareto-superior outcome by abandoning the price margin of Arrow and Debreu markets. When the transactions costs of using markets are relatively high, firms will explore nonstandard contracts to complete the trade. However, we need to underscore the importance of relying on the high-powered incentives of markets wherever possible. Any deviation from free market exchange should be accompanied by an economic audit that estimates net benefits from a policy's second-best solution.

Countertrade offsets have been shown to support multiple objectives. First, the buyer can leverage its purchasing power to elicit economic benefits from the seller that might otherwise not be forthcoming. Though data are not available, anecdotal evidence suggests that technology transfer is inhibited in free market exchange but not to the same extent in countertrade. Second, countertrade agreements can assist a country in its efforts to penetrate foreign markets, gain reputational capital, learn production methods, and strike new relationships with suppliers (to perform subcontracting, coproduction, and licensed production for example). Third, these arrangements are frequently used to maintain and/or develop domestic DIBs. Despite the fact that it usually is not cost-effective to do so, the purchasing government may elect to produce domestically at a higher cost relative to off-the-shelf purchases, for national security reasons. Fourth, countertrade offsets have evolved to support economic development projects that are unrelated to the base transaction. These indirect offsets are designed to grow local industry that will eventually be competitive in international markets. The UAE's offset program was a pioneer in the use of performance metrics to judge *ex post* results.

A shortcoming in the literature had been a lack of guidance on how government ought to measure performance of the countertrade agreement. In this section we detailed the advantages and disadvantages of several proposed metrics. For the prototypical countertrade contract, we recommend a combination of input and output metrics. Reliance on a single metric – while simpler and more transparent – is usually unable to evaluate contracts designed to serve multiple objectives.

The final section of the chapter presents empirical evidence from a database that tracks countertrade agreements in international procurement from 2003 to 2007. Several important findings can be deduced from the data. First, countertrade transactions are still very much part of the global marketplace. The data suggest that countertrade is as important today as it was a decade ago. The US, EU, and WTO have all, to varying degrees, argued for less reliance on countertrade and offsets in international government procurement. On the other hand, many developing countries view the multifaceted benefits of offsets as an appropriate response to markets traditionally dominated by MNEs from the West. Second, less-developed countries use barter, counterpurchase, and indirect offset arrangements much more than the industrialized West. Conversely, most industrialized countries use offsets that are directly related to the base good. This can be explained by differential technology absorption rates and heterogeneous labor markets.

Furthermore, developed countries often purchase defense and aerospace products to meet at least part of its national security objectives. The direct offsets are used to maintain, and indeed bolster the remaining portions of the domestic defense industry. The extent to which offsets are successful in this regard is unclear.

Third, preliminary analysis of the data reveals that barter and buyback agreements in public procurement have declined considerably compared to previous decades. With respect to variables influencing the selection of countertrade offsets, the conservation of foreign exchange is rejected. Countries seek offsets for a variety of economic and noneconomic reasons: the opportunity to save hard currency is not among them.

References

- Arrow K, Debreu G (1954) Existence of an equilibrium for a competitive economy. *Econometrica* 22:265–290
- Baldwin R (1969) The case against infant-industry tariff protection. *J Polit Econ* 77(3):295–305
- Brauer J (2004) Economic aspects of arms trade offsets. In: Brauer J, Dunne P (eds) *Arms trade & economic development*. Routledge, London, pp 54–65
- Chang H-J (2008) *Bad Samaritans: the myth of free trade and the secret history of capitalism*. Bloomsbury Press, New York
- Countertrade and Offset (2003) Special report: Dutch Audit (Issue 3). CTO Data Services Co, London
- Countertrade and Offset (2003–2007) Issue archives (Issues 1–24 each year). CTO Data Services Co, London
- Countertrade and Offset (2004) Kuwait: an updated account of foreign contractors' offset projects (Issue 2). CTO Data Services Co, London
- Countertrade and Offset (2007) SAAB and Poland sign offset (Issue 20). CTO Data Services Co, London
- European Defence Agency (2009) Annex A: the code of conduct on offsets. In: U.S. Department of Commerce (ed) *Offsets in defense trade*, 14th edn. U.S. Government Printing Office, Washington
- Fama E (1991) Time, Salary, and Incentive Payoffs in Labor Contracts. *Journal of Labor Economics*, 9(January):25–44
- Hall P, Markowski S (1994) On the normality and abnormality of offset obligations. *Defence Peace Econ* 5:173–188
- Hall P, Markowski S (2004) Mandatory defence offsets: conceptual foundations. In: Brauer J, Dunne P (eds) *Arms trade & economic development*. Routledge, London, pp 44–53
- Hennart JF (1989) The transaction cost rationale for countertrade. *J Law Econ Organ* 5:127–153
- Jang W-J, Joong TY (2008) The defense offset valuation model. *DISAM J*. [Online]. Available at: http://findarticles.com/p/articles/mi_m0IAJ/is_4_29/ai_n24261651/?tag=content;col1. Accessed 2 Jan 2010
- Linarelli J (2003) The WTO transparency agenda: law, economics and international relations theory. In: Arrowsmith S, Trybus M (eds) *Public procurement: the continuing revolution*. Kluwer Law International, London, pp 235–268
- Martin S (ed) (1996) *The economics of offsets: defense procurement and countertrade*. Harcourt Academic Publishers, Amsterdam
- Northrup Grumman (2009) Product listing. [Online]. Available at: <http://www.atoz.northropgrumman.com/Automated/AtoZ/L.html>. Accessed 10 June 2009
- Penrose E (1959) *The theory of the growth of the firm*. Basil-Blackwell Publishers, Oxford

- Reinert E (2007) How rich countries got rich and why poor countries stay poor. Carroll & Graf Publishers, New York
- Succar P (1987) The need for industrial policy in LDC's – a restatement of the infant industry argument. *Int Econ Rev* 28(2):521–534
- Taylor TK (2004) Using offsets as an economic development strategy. In: Brauer J, Dunne P (eds) *Arms trade & economic development*. Routledge, London, pp 30–43
- Taylor TK (2005) A transaction cost approach to countertrade and offsets in international government procurement. *J Int Business Econ* 3(1):117–132
- Trionfetti F (2003) Home-biased Government Procurement and International Trade: descriptive statistics, theory, and empirical evidence. In: Arrowsmith S, Trybus M (eds) *Public procurement: the continuing revolution*. Kluwer Law International, London, pp 223–233
- United States Department of Commerce (2007) Offsets in defense trade: annual report to congress, 12th edn. U.S. Government Printing Office, Washington
- United States Department of Commerce (2009) Offsets in defense trade: annual report to congress, 14th edn. U.S. Government Printing Office, Washington
- United States Department of Commerce (2010) Offsets in Defense Trade: Annual Report to Congress, 15th edn. U.S. Government Printing Office, Washington
- United States Presidential Commission on Offsets in International Trade (2001) Status report of the presidential commission on offsets in international trade. United States Presidential Commission on Offsets in International Trade, Washington
- Williamson O (1983) Credible commitments: using hostages to support exchange. *Am Econ Rev* 73:519–540
- World Trade Organization (2010) Members and observers. [Online]. Available at: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.html. Accessed 30 Apr 2010
- World Trade Organization (1994) Uruguay Round Agreement on Government Procurement. [Online]. Available at: http://www.wto.org/english/docs_e/legal_e/gpr-94_02_e.htm#articleXVI. Accessed 22 March 2010

Designing Public Procurement Policy in Developing
Countries

How to Foster Technology Transfer and Industrialization
in the Global Economy

Yülek, M.; Taylor, T.K. (Eds.)

2012, XX, 268 p., Hardcover

ISBN: 978-1-4614-1441-4