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Using procurement offsets as an economic development strategy

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Introduction

Notwithstanding the reported success of many offset arrangements (particularly from the buyer's perspective), economists are understandably cautious of any policy that diminishes the role of prices in market exchange. Instead of competing in terms of price and quality, offsets encourage sellers to focus on benefits packages that may have no relevance to the procured good. In most settings, the exchange of goods for money in markets is more efficient than barter.

Why, then, do governments accept in-kind offsets instead of price discounts for the procured good? Even if we acknowledge a role for government intervention when markets fail to transfer goods and services efficiently, it is not clear that the expected net benefits of offsets exceed those of other policy tools. Indeed, offsets may be helpful to an economy in some settings, but quite damaging in others. Commenting on the state of policy, Udis and Maskus (1991, p. 163) "recommend a serious effort to develop criteria to distinguish between beneficial offsets and detrimental offsets before attempts at international control of the phenomenon are mounted."

This chapter develops a criterion to determine when an offset is an appropriate policy instrument for government procurement. I present a policy matrix that offers general guidelines to government officials considering offsets as part of a broader procurement strategy. The matrix permits a comparative-institutional analysis of several types of offset policy under alternative institutional environments.¹ Using transaction cost theory supplemented by the capabilities view of the firm,² I explain how the welfare effect of offsets hinges on the exchange setting and the institutions of the purchasing economy. The main finding of the chapter is that any attempt to use a mandatory offset policy for all government procurement limits the dimensions of the negotiation and may suffer from diseconomies of scale and scope. A more flexible offset policy, which requires offsets for a particular class of goods and relies on markets in other cases, is preferable in most settings. In this regard, the model developed here generalizes the point made by Hall and Markowski (1994) concerning the ambiguous welfare effects of offsets.

The first section of the chapter explains why governments might wish to use offsets in procurement. The second section develops a prescriptive model based on the exchange environment and the transactors in question. A procurement policy matrix is developed in section three. The matrix juxtaposes the net benefits of traditional market exchange with nonstandard contracts, including offsets, under various economic settings. The final section guides procurement officials through the offset selection process and summarizes the principal findings of the chapter.

Why offsets?

As a large buyer, government has bargaining power that allows it to extract rent from sellers earning supernormal profits. Usually buyers with some degree of market power will bargain for price discounts. In stark contrast, governments selecting offsets often receive benefits off the price margin: the offset calls for the seller to transfer some form of economic activity to the buyer's domestic economy.

Offsets may implicitly lower the price of the total package (the base good plus the offset), P_{total} , whereby $P_{\text{total}} \leq (P_{\text{base}} + P_{\text{offset}})$. Akin to bundling in this respect, the base good, the offset, or both may sell at a discount. When a government does not use its oligopsony power to achieve price discounts for the base good, it points to the existence of market imperfections and the importance of non-market activity. In two important papers, Williamson (1985) and Hennart (1989) show that nonstandard contracts often arise to combat poorly functioning markets.

Governments use offset policy because it is a convenient way to extract rent and to achieve multiple objectives. These objectives include acquiring new technology and capabilities, supporting key industries, gaining access to new markets, generating export earnings, and forming strategic alliances with established multinational enterprises (MNE). Offsets are politically attractive largely because the expected benefits are more visible than the expected costs. In especially hazardous transaction environments, offsets can also support exchange.³

Of course, government can choose from a variety of policy instruments to achieve these objectives. Only after performing a detailed benefit-cost analysis among the policy instruments (e.g., tariffs, quotas, local content protection, subsidies, and offsets) should a government consider using offsets.

Procurement settings

Consider the government procurement agency in a developing country.⁴ In many markets, government is the single largest buyer. In the discussion that follows, I assume government has some degree of oligopsony power. If government wishes to use its oligopsony power in procurement, it can select any of the following policies: price discounts in markets, strategic alliances, turnkey contracts, offsets, or product-in-hand contracts. When, if ever, are offsets preferable to these other policy instruments?

Government purchases a large variety of goods, ranging from chairs, cafeteria food, and ashtrays, to satellites, advanced aircraft, and disembodied technology. Some markets approach the neoclassical model of perfect competition, while others clearly do not. In a world of positive transaction costs, bounded rationality, and asymmetric information, buyers and sellers encounter varying degrees of exchange hazard in markets. Let z be an index of exchange hazard in markets, where $z \in [0,1]$. The definition here does not equate severe exchange hazard ($z=1$) with monopoly. In this model, the variables that affect exchange are information and contract completeness. In markets that approach the textbook competitive model, buyers and sellers have perfect information about product quality, cost, and valuation. In addition, the parties can write complete contracts that cover every contingency. In this setting, we expect to see products with replicable

competences embodied in the production process and easily codified directions for product use and maintenance. Examples of this type of procurement include food items, light bulbs, pens, and so forth.

Exchange hazard tends to increase as the market structure approaches oligopoly. Oligopoly and monopoly markets are more susceptible to exchange hazard because many of the goods and services in these markets embody high technology and tacit information. These attributes, in conjunction with the information problems and positive transaction costs previously alluded to, increase the probability of opportunistic behavior on the part of the seller or the buyer. Note that market structure, *per se*, is neither necessary nor sufficient for exchange hazard to be high. It is conceivable that exchange hazard for a transaction under monopoly is lower than the same transaction under oligopoly. In fact, if we assume perfect information and contract completeness in monopoly and oligopoly, exchange hazard approaches zero under these market structures as well. When $z=0$, markets function efficiently: governments usually use their bargaining power to obtain price discounts instead of nonstandard (offset) contracts.

In markets where transaction costs approach zero and contracts are complete, government procurement with offsets or other nonstandard instruments needlessly raises the cost of doing business. Costs rise by the amount of the administrative burden, plus the costs of rent-seeking from the government intervention. The perfectly competitive setting is the benchmark case from which we conduct the comparative-institutional analysis. Moving along the spectrum from the textbook competitive setting toward hazardous exchange, one might expect the role of offsets in procurement policy to change. In fact, this is precisely what we find.

Most markets are far from perfect. Information is often asymmetric, allowing for various forms of moral hazard and adverse selection to arise. Sellers may act opportunistically by shirking, fulfilling duties in a perfunctory manner, and engaging in expropriation when contracts are incomplete and the buyer invests in specific assets. Oligopoly and monopoly tend to house a higher degree of exchange hazard largely because the output embodies core competences possessed by only one or a small number of firms. Combined with imperfect information, the index, z , tends toward one.

Apart from exchange hazard, the other variable in the policy matrix is an expected benefit index, B , for the domestic firm(s) awarded the offset work. The value of the index depends on three factors: the reputational capital of the seller, the ability of the domestic firm to raise its profile in international markets from working with an established MNE (i.e., the recipient's potential reputation), and the probability of continued interaction between the seller and the domestic firm(s) after the completion of the offset agreement. Increases in any of these factor raises the value of B . The probability of future interaction depends on multiple factors, most notably the stock of capabilities in the purchasing economy. If local firms possess the requisite capabilities to fulfill the seller's offset obligation with few extra costs, the firms are more likely, *ceteris paribus*, to strike a cooperative agreement in the future.

The benefit index varies considerably. At one end of the spectrum is so-called anonymous exchange: the seller has little or no reputational capital. In other words, if the purchasing government requires the seller to form an alliance with a domestic firm to fulfill an offset, the domestic firm will not benefit from any external reputation economies. Another scenario considers a foreign seller with positive reputational capital.

If awarded offset work, the domestic firm expects to benefit from association with the reputable MNE. Filling work orders (the offset) for an established seller helps the domestic firm in two critical ways. First, the offset may assist in the building of new capabilities. The firm that agrees to a subcontracting offset (even in a one-period game) has incentive to teach the local firms efficient production techniques. This is the *a priori* reasoning, because if the seller does not teach the most efficient routines and quality-control methods, it is unlikely to minimize cost.⁵ The domestic firm may be able to leapfrog onto the incumbent's learning curve, possibly averting mistakes in the early stages of production. Second, and equally important, the one-time offset work can raise the domestic firm's international reputation. By satisfactorily completing the offset work for the seller, the domestic firm receives the crucial "stamp of approval" in third markets. The strategic alliance allows the domestic firm to economize on the transaction costs required to build a customer base and distribution network. In the absence of an alliance with a reputable MNE, firms in developing countries pay high transaction costs convincing distributors to make the desired specific asset investments.

A study for the General Electric Trading Company concluded that firms from developing countries face severe hurdles in export markets. Assistance from international trading companies and distributors is "highly expensive [for the export of] differentiated products and in countries offering products not traditionally exported" (Hennart, 1989, p. 143). Examples of alliances benefitting new, untested firms abound. Consider the case of IBM and Microsoft in 1982. IBM agreed to purchase a new operating system, MS-DOS, from a relatively unknown and innovative firm called Microsoft. Microsoft immediately gained credibility in the international markets from working with IBM (Teece, 1986). Cipher Data Products can tell a similar story. Cipher signed a contract with IBM to develop a new, lower-priced version of IBM's 3480 half-inch streaming cartridge drive. Cipher's vice president for strategic management explained that after successfully working with IBM, "you can sell into any arena" (Teece, 1986, p. 294). Clearly, reputational economies assist firms in entering new markets and lowering transaction costs.

In sum, domestic industries can derive long-term benefits from a single government purchase that includes a strategic alliance between the seller and competitive domestic firms. Nevertheless, one should not view this as a *carte blanche* for offsets when the selling firm has some degree of reputational capital. Whether an offset is the appropriate policy choice for the procurement also depends on the exchange hazard (of the base good) and on the administrative burden of the offset. Having introduced the two variables that shape the policy matrix, the next section explains when offsets are preferable to other policy instruments.

<i>High</i> <i>Index of expected</i> <i>benefit (B)</i> <i>Low</i>	<i>Augmented markets</i>	<i>Variable offsets</i>	<i>Mandatory offsets</i>
	Government facilitated co-ops	Enlarged choice set can maximize buyer's welfare; may or may not use offsets	Benefits outweigh the costs in a small subset of goods
	<i>Markets</i>	<i>Turnkey contracts</i>	<i>Product-in-hand contracts</i>
	Arms-length exchange is Pareto efficient	Performance bonds helps	For lumpy, high technology purchases; seldom used
<div style="display: flex; justify-content: space-between; align-items: center;"> 0 <i>Degree of exchange hazard</i> 1 </div>			

Figure 2.1: Procurement policy matrix

Policy matrix

Procurement policy is defined as the outcome of the social planner's welfare maximization problem. The simple model discussed here focuses on the markets and hierarchies aspects of contract design in government procurement. To maximize welfare, procurement policy needs to adapt to multiple exchange environments. No single procurement instrument is efficient for all environments.

General recommendations for procurement policy can be made by varying the parameters of the matrix, namely the degree of exchange hazard ($z_E \in [0,1]$) and the expected benefit to the offset recipient of interaction with the seller (B is low or high). Consider the scenarios in figure 2.1. Six distinct policy instruments are advisable for the six economic settings (cells in the matrix). An offset policy is advisable in only two of the six cases. Perhaps most importantly, a mandatory offset program is appropriate if, and only if, exchange hazard is high (approaches the index value of 1) and the expected benefit index, B , is high as well. Let us examine the policy prescription for each economic setting.

Arms-length exchange

In the absence of impediments to the transaction, markets are the most efficient means of exchange. This economic setting comprises atomistic and largely anonymous sellers. The high-powered incentives of market competition, teamed with nominal transaction costs, make this form of procurement policy plausible for governments—irrespective of market power. If government does in fact possess some degree of market power, it can bargain for price discounts of the procured good. There is no *a priori* reason to leave the price margin in this economic setting. This policy prescription holds irrespective of

government's overarching development strategy. Capabilities acquisition strategies, for example, function smoothly in markets when information is perfect. Employing offsets in a perfectly functioning market tends to reduce welfare for three reasons. First, sellers are already pricing at marginal cost (hence no opportunity for further rent extraction by government), second, technology is already transferring efficiently, and third, offsets incur an administrative burden.⁶ Examples of procurement in this category include food, paper clips, ball bearings, and so forth.

Augmented markets (markets with alliances)

Consider a scenario where markets function efficiently (z approaches zero, and B is positive). This scenario is common for the procurement of goods that embody medium technology in production. Table 2.1 ranks industries according to the technological intensity of the production process. The medium technology category of industries, which includes goods such as scientific equipment, petroleum refining, shipbuilding, and motor vehicles, is suitable for the augmented markets scenario. Although we can expect markets to perform well, a nascent industry in the purchasing government's economy may benefit from a strategic alliance with an incumbent.

The social planner opts for markets but also encourages collaborative projects. Markets are preferable because information problems are non-existent, which greatly reduces the probability of opportunistic behavior in the exchange. However, if buyers generally display an allegiance to brand name capital, a strategic alliance may prove beneficial to the domestic firms. The government can use its bargaining power to encourage collaborative agreements without formally requiring them (e.g., an offset), thereby avoiding extra administrative costs.

If a seller agrees to form a strategic alliance, the purchasing government is essentially substituting content for price discounts. In short, we can make an argument for an industrial participation program in government procurement instead of price discounts, even when capabilities transfer at no extra cost in markets.

Importantly, the market is still the driving force behind the collaboration opportunity. Only domestic firms that possess the requisite capabilities can submit bids under this procurement program. The seller selects domestic firms based entirely on price and quality competition. Therefore, the high-powered incentives of market competition remain largely intact. Furthermore, encouraging the seller to form an alliance with an informal best-efforts policy⁷ prevents administrative costs from rising much. The administrative burden of the augmented market policy exceeds that of pure markets (scenario 1), but not by a sizeable amount. Moreover, a best-efforts approach provides sellers with leeway when confronted with a shortage of requisite capabilities in the purchasing government's economy.

Governments are already experimenting with the augmented markets procurement policy. Matthews (1996, p. 234) finds that "a number of countries such as Greece and Spain are now encouraging the creation of long term business partnerships within their [procurement] programs." The most popular collaborative instruments include joint ventures, licensed production, coproduction, and direct foreign investment.

Table 2.1: Industry ranking according to technology-intensity of production

<i>Level of technology and industry</i>	<i>ISIC</i>
High technology	
1. Aerospace	3845
2. Computers, office machinery	3825
3. Electronics-communications	3832
4. Pharmaceuticals	3522
Medium-high technology	
5. Scientific instruments	385
6. Motor vehicles	3843
7. Electrical machinery	383–to 3832
8. Chemicals	351+352+3522
9. Other transportation equipment	3842+3844+3849
10. Non-electrical machinery	382–3825
Medium-low technology	
11. Rubber and plastic products	355+356
12. Shipbuilding	3841
13. Other manufacturing	39
14. Non-ferrous metals	372
15. Non-metallic mineral products	36
16. Fabricated metal products	381
17. Petroleum refining	351+354
18. Ferrous metals	371
Low technology	
19. Paper printing	34
20. Textiles and clothing	32
21. Food, beverages, and tobacco	31
22. Wood and furniture	33

Source: Hatzichronoglon (OECD, 1997).

Australia's Partnerships for Development (PfD) program is an example of a successful augmented-markets policy. Created in 1990, the PfD encourages foreign companies to undertake long-term investment in R&D and augment the industrial technological base.

The program waives “offsets requirements for foreign companies which agree to enter into strategic alliances with Australian companies in the information and telecommunications industries” (Capling, 1994, p. 12). It maintains a competitive bidding process for domestic firms wishing to participate, while using government’s market power to increase the stock of reputational capital in these industries. The PfD program is especially beneficial to Australian software manufacturers, “who have developed world class products but have not had sufficient resources to devote to worldwide marketing” (Capling, 1994, p. 12). By 1993, 21 multinational enterprises had signed agreements with the Australian government to participate in the PfD program (Capling, 1994, p. 12). This augmented-market policy is well conceived and appropriate for an environment with low exchange hazard and a positive reputation/future interaction variable.

Turnkey contracts

In a procurement setting exposed to moderate exchange hazard combined with little or no expected reputational economies from the seller, a turnkey contract supported by a performance bond is a sound policy choice.

Turnkey contracts lower exchange hazard by shifting risk from the buyer to the seller. The seller signs a contract to build an operational factory (or other good) for the buyer. By signing a detailed contract, the seller is legally responsible for the

Table 2.2: Turnkey contracts in procurement

Advantages

Ownership and control in the post-contract stage is retained by the owner or purchaser; Single, legally responsible seller reduces transaction costs for the buyer; Single seller generally ensures shorter time-to-completion for project; Less risk for the buyer; Useful for the construction of complete plants.

Disadvantages

Higher price and fewer bids; Plant facility (or other contracted good) is constructed with little participation by the buyer and employees; less learning-by-doing; While ancillary competences transfer easily, local employees may not gain crucial tacit knowledge.

Source: Adapted from United Nations (1983, pp. 10–11)

initial feasibility study, the design, engineering, and construction of the plant. In addition, the seller does not receive full payment until several production runs are complete.⁸ Table 2.2 lists the advantages and disadvantages of turnkey contracts. turnKey contracts.

Turnkey contracts improve the integrity of the exchange, but they do not eliminate seller opportunism entirely. Occasionally, the output of the initial production trials is acceptable, but local workers trained under the supervision of the technical staff fail to replicate the technical Staff fail to replicate the Outcome.⁹ This is not surprising: production in a sterile environment under the direction of the seller’s technical staff is in stark contrast to real-time production by local workers. Algeria’s problems with turnkey contracts have been well documented in this regard (see Oman, 1983).

Information asymmetries and other imperfections render market exchange hazardous and inefficient as the technological intensity of production increases. The government can

use its monopsony power to negotiate a more efficient mode of exchange with the turnkey contract, which places the onus on the seller. Since the primary objective in this setting is to improve the integrity of the transaction, the procurement officer's relevant choice is between turnkey and offset arrangements.

Generally, if the objective is to obtain an end-use good like a functioning chemical plant, the turnkey contract is a suitable choice. In this case, the buyer's primary interest is in improving the incentives of the exchange to minimize transaction hazards. If, however, the government intends to develop the capabilities of the good for other applications, the choice between offsets and turnkeys is not so obvious. Officials can design the offset to acquire capabilities while also increasing the integrity of the exchange.

Variable offset policy

A variable offset policy is suitable for environments characterized by moderate exchange hazard and high expected benefits from interaction with the seller. This policy gives procurement officers the choice of attaching an offset to the government purchase, or negotiating price discounts in markets. It offers more flexibility than strict mandatory offset schemes. The flexibility enlarges the opportunity set available to government negotiators and reduces the potential for diseconomies of scope.¹⁰ Negotiators can compare the net benefit of a price margin exchange with an offset for the particular economic setting. This increases the dimensions of the exchange and reduces the probability of the buyer accepting an offset proposal that results in production diseconomies.

With more flexibility in contract negotiations comes added responsibility for procurement officers. Governments using variable programs require bureaucrats to compare complex intertemporal costs and benefits associated with offsets to price changes from market exchange. Governments without highly skilled professionals in procurement may be better off using a mandatory scheme or markets—not both embedded in a variable offset policy.

Of the various nonstandard contracts, the variable offset policy offers the most dimensions for mutually beneficial exchange. Procurement officers can adjust the terms of the exchange to support a development strategy that is appropriate for the country. After experimenting with mandatory offsets during the 1970s and part of the 1980s, Australia switched to a variable offset policy. The consensus in Australia is that the policy has fulfilled its objectives (namely, technology transfer) while not handcuffing negotiators to non-price margin schemes (Capling, 1994; Hall and Markowski, 1996; Markowski and Hall, 2004). Nevertheless, today many governments opt for mandatory offsets in procurement.

Mandatory offsets

Mandatory offsets are ideal for procurement that is subject to severe exchange hazard and high expected benefits from interaction with the seller. A mandatory offset policy requires offsets for government procurement (of specified goods and services) from a foreign seller above a threshold dollar value. This policy encourages competition based on content rather than price. Mandatory offsets are easier to administer than the

challenging variable scheme because bureaucrats are solving an optimization problem over fewer variables.¹¹

Another benefit of the mandatory policy is its impact on rent-seeking behavior. All types of government intervention in the marketplace attract some degree of rentseeking behavior by economic agents, i.e., firms, interest groups, and government officials. Rent-seeking behavior is inimical to societal welfare because agents expend real resources to capture rents without producing new output. Buchanan, *et al.* (1980, p. 10) argue that "once markets are not allowed to work, or once they are interfered with in their allocative functioning, politics must enter. And political allocation, like market allocation, involves profit seeking as a dynamic activating forcez...the rents secured reflect a diversion of value from consumers generally to the favored rent seeker, with a net loss of value in the process."

A policy of variable offsets is susceptible to higher levels of rent-seeking than a policy of mandatory offsets because procurement officials have free reign to choose between prices (markets) and content modifications (offsets). Price changes directly affect government expenditure, and offsets impact domestic industry. The variable policy, therefore, attracts rent-seekers internally (including the offset agency itself) and externally (interest groups).

The mandatory policy attracts less rent-seeking because of the strict directive for offsets whenever government makes a purchase above a threshold dollar value. The key is to design the policy such that government procurement of a selected list of goods automatically triggers a mandatory scheme. High-technology goods (see table 2.1) can support a mandatory scheme. Government procurement of aerospace, information technology, and telecommunications equipment, for example, occupies this category.

The conclusions drawn from the model allow one to argue strongly against the use of mandatory offsets outside of high-technology procurement. If exchange hazard is less severe and government still employs a mandatory offset policy, the buyer is implicitly rejecting price margin contracts that are potentially superior to the offset. Some countries are in fact following the selective mandatory policy outlined above. Israel, for instance, maintains a sophisticated program that mandates offsets for procurement of high-tech military hardware, hospital equipment, computer hardware, and civilian aircraft (Harben, 1984, p. 33).¹² These goods carry potentially severe exchange hazard, and the expected benefit from the seller's reputational capital is high.

Conversely, many European governments require 100 percent mandatory offsets for much defense procurement. At first glance, this policy appears to fulfill the necessary conditions for optimality put forth in the model. However, defense industry procurement encompasses an incredibly wide range of goods and services, many of which are low technology. Defense procurement includes generic ammunition and other ordnance, tires, clothing, and ball bearings, for example. The rigid mandatory policy is detrimental to European welfare because the opportunity cost of imposing offsets for goods that do not present an exchange hazard is price-margin savings.

After observing unsatisfactory results of a mandatory policy in the 1980s, Malaysia switched to a variable program in the 1990s.¹³ Australia had a similar experience. The objective of the mandatory policy of the 1980s was to increase the level of technological capabilities in strategic industries. Government officials believed that an across-the-board mandatory offset policy would generate high rates of technology transfer. The policy was

a failure. Sellers inundated procurement officials with thousands of offset proposals. Clearly, requiring atomistic firms to include offsets in the sale simply raises the output price with almost no reputational effect for the purchasing economy. Liesch (1991) finds that Australian procurement officials used workload and job creation data to determine the efficacy of an offset proposal, often failing to evaluate the quality of technology transfer. He writes (1991, p. 121) that “government mandated countertrade [offset] programs seem particularly prone to this outcome.”

Product-in-hand contracts

The sixth economic setting of the policy matrix combines severe exchange hazard with little or no expected benefit from interaction with the seller. In this setting, it is critical to build safeguards into the contractual arrangement, but offsets would be an inefficient way of doing so. Since strategic alliances and other interaction with the seller are unlikely to bear fruit, the cost of the offset burden will likely exceed any benefits. Instead, government may find it advantageous to employ a variant of the turnkey contract, known as the “product-in-hand” contract. This arrangement requires the seller to set up an operational system, akin to the turnkey contract. In contrast to the turnkey, however, the seller’s staff remains on-site after the trial runs to teach local employees how to maintain and troubleshoot the system. Only after local personnel demonstrate competency during multiple production runs does the seller receive full payment. This contract greatly reduces the probability of seller opportunism.

With risk transferring almost entirely to the seller, the output price of product-in-hand contracts rises drastically.¹⁴ Moreover, the strict conditions of the contract attract a much smaller pool of bids than the turnkey arrangement. For these reasons, governments seldom employ product-in-hand contracts in procurement. The purchase of an entire chemical plant that includes numerous specific assets in the production process is an example.

An optimal offset policy

The selection of an offset (variable or mandatory) depends on the level of technology embodied in the base good and the reputation of the seller—two variables that figure prominently in the policy matrix. The level and nature of technology drive the selection process from the beginning. The model developed here discourages the use of offsets for procurement of goods and services that embody medium and low technology. Low-technology procurement is suitable for arms-length exchange in competitive markets, and governments can handle medium-technology goods with an augmented-market strategy (encouragement of cooperative agreements, but no offset requirements).

When procurement embodies high-technology goods, we need to obtain more information before deciding upon offsets, turnkeys, or product-in hand contracts. In general, if the exchange embodies high technology requiring the transfer of tacit knowledge, and/or severe rent-seeking is especially pervasive in government, I advise rules rather than discretion with the mandatory offset. If domestic firms stand to benefit

from an alliance and association with the seller, offsets become relatively more attractive than turnkey and product-in-hand contracts.

Finally, the decision whether to employ a direct offset or an indirect offset is a function of government's objectives. If government uses the instrument largely to safeguard an exchange in a hazardous setting, the direct offset is preferable. In contrast, if government views the offset as an economic development strategy that aids capabilities acquisition, market penetration, or the reduction of information barriers, an indirect offset is better because of its wide applicability. Several practical findings of this study could improve offset policy.

First, if government purchases the desired good in perfectly competitive markets, the administrative burden of offsets is greater than any benefits. Offsets are not advisable in this economic setting. Second, given some degree of exchange hazard, offsets are Pareto-superior to turnkey and product-in-hand contracts when either (a) there are expected net benefits from cooperation with the seller (e.g., reputation spillovers, subcontracting, coproduction, training, and so forth), or (b) government suffers from acute rent-seeking among its bureaucrats. A particular construct of offsets can reduce rent-seeking through non-monetary (barter) exchange with the seller.¹⁵ And third, mandatory offsets are of limited use because they ignore institutional differences across the various exchange settings. In the model developed here, mandatory offsets are advisable in government procurement only for a select category of high-technology goods or when severe rent-seeking behavior debilitates the use of a variable offset policy.

Notes

1. In Williamson's (1985) view, comparative institutional analysis is a critical part of policy design.
2. Transaction cost economics explores the costs of using markets. It began with Ronald Coase's (1937) analysis of the firm. Oliver Williamson (1983; 1985) and others helped it to achieve critical mass in the late 1970s and 1980s. The capabilities view of the firm considers the firm to be a pool of core and ancillary competences that become routinized over time to produce output.
3. See Taylor (2001) for a transaction cost approach to offsets.
4. This part of the analysis is particularly useful for developing countries, although the findings and recommendations are suitable for developed economies as well.
5. This does not remove the possibility that capabilities may not transfer completely. Taylor (2001) explains that sellers may accept cost penalties to preserve core competences in a dynamic setting. In addition, the buyer's economy may not be able to absorb transferred capabilities due to an absence of industrial slack.
6. See Taylor (2001) for a discussion of how offsets alter the marginal, average, total, and transaction costs of the seller.
7. A best-efforts agreement calls for the seller to fulfill a target level of work in the purchasing economy over a period that may or may not be specified. The agreement is not binding and does not include any penalty clause for non-compliance.
8. The seller receives partial payment during the initial stages of the project, and the remainder upon successful completion of the trial runs. There are notable variations to this sort of compensation scheme. For highly technical projects, the seller receives payments according to the percentage of the project that is complete. In the extreme case, a buyer may not release full payment for one or two years after the trial production runs.
9. Some trial periods last only 24–48 hours.

10. Frequently, an indirect offset agreement may call for the seller to engage in activity that is outside the scope of its capabilities. There is a tendency for cost to escalate with indirect offsets because the seller produces in the rising portion of the average cost curve.
11. The relevant comparison for the bureaucrat is between bundled packages offered by different sellers. The bureaucrat does not need to calculate the offset's shadow price equivalent to make an accurate comparison with price margin offers.
12. The procurement of these goods triggers an offset if the value of the transaction exceeds \$1 million.
13. Interview with Mr. Ahmed Khalili, Director of the Malaysian offset program, 2 June 1998.
14. Hennart (1989) reports that product-in-hand contracts are 50 to 100 percent more expensive, on average, than turnkey contracts.
15. Given market power that allows for the extraction of rent, government has two choices: it can bargain either for price discounts or receive extra benefits (offsets) off the price margin. If government cannot rely upon bureaucrats to make effectual use of the money from price discounts, offsets look more attractive. Some offsets avoid price discounts altogether and instead inject benefits directly into the economy.

References

- Buchanan, J., R. Tollison, and G. Tullock (eds.) (1980) *Toward a Theory of the Rent-Seeking Society*. College Station, TX: Texas A&M University Press.
- Capling, A. (1994) "Bargaining for Competitive Advantage: Government Purchasing and the Changing Relationship Between the State and Multinational Enterprises in Australia." *Journal of Industry Studies* Vol. 1, No. 2, pp. 1–22.
- Coase, R.H. (1937) "The Nature of the Firm." *Economica* Vol. 4, pp. 386–405.
- Hall, P. and S. Markowski (1996) "Some Lessons from the Australian Defense Offsets Experience." *Defense Analysis* Vol. 12, No. 3, pp. 289–314.
- Hall, P. and S. Markowski (1994) "On the Normality and Abnormality of Offset Obligations." *Defence and Peace Economics* Vol. 5, No. 3, pp. 173–188.
- Harben, P. (1984) "Offset Overview." *Countertrade & Barter Quarterly* Vol. 3, pp. 29–37.
- Hatzichronoglou, T. (1997) "Revision of the High-Technology Sector and Product Classification." OECD STI Working Papers 2, pp. 1–25. Paris: OECD.
- Hennart, J.F. (1989) "The Transaction Cost Rationale for Countertrade." *Journal of Law, Economics and Organization* Vol. 5, pp. 127–153.
- Khalili, A. Interview with Mr. Ahmed Khalili, Director of the Malaysian offset program, 2 June 1998.
- Liesch, P. (1991) *Government Mandated Countertrade*. Aldershot, UK: Avebury.
- Markowski, S. and P. Hall (2004) "Defense offsets in Australia and New Zealand," chapter 18 in J. Brauer and J.P. Dunne (eds.) *Arms Trade and Economic Development: Theory, Policy, and Cases in Arms Trade Offsets*. London: Routledge.
- Matthews, R. (1996) "Saudi Arabia's Defense Offsets Programmes: Policy and Performance." *Defence and Peace Economics* Vol. 7, No. 3, pp. 233–251.
- Oman, C. (1983) "New Forms of International Investing in Developing Countries." Paris: OECD Development Center.
- Taylor, T. (2001) "A New Institutional Economic Analysis of Offset Arrangements in Government Procurement." Unpublished doctoral dissertation chapter. Department of Economics. University of Connecticut.
- Teece, D. (1986) "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy." *Research Policy* Vol. 15, pp. 285–305.

- Udis, B. and K.Maskus (1991) "Offsets as Industrial Policy: Lessons from Aerospace." *Defence Economics* Vol. 2, No. 2, pp. 151–164.
- United Nations (1983) "Features and Issues in Turnkey Contracts in Developing Countries: a Technical Paper." New York: United Nations Press.
- Williamson, O. (1985) *The Economic Institutions of Capitalism*. New York: Free Press.
- Williamson, O. (1983) "Credible Commitments: Using Hostages to Support Exchange." *American Economic Review* Vol. 73 (September), pp. 519–540.