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The Sub-Optimal Effect of Decreasing Military Capability – A Canadian Study

by Ross Fetterly

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POLICY PERSPECTIVE

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Executive Summary

Defence budgets seldom remain constant, despite the long-term orientation required in defence planning. However, short-term fluctuations in funding can disrupt military programs and activities, and the impact can last several years. This is, in part, due to the unique mix of personnel, equipment and operations, which the defence budget funds. In times of rapid and unplanned defence budget reductions, short-term decisions can be made that are not necessarily in the best interest of the efficient and effective management of the armed forces. Indeed, significant unforecasted funding reductions could produce and reinforce dysfunctional behaviour. Defence budget reductions, to be effective, must include reductions in each of personnel, operations and maintenance, and capital categories in order to maintain a balance between current demands and building future capability. This study uses the Royal Canadian Navy to demonstrate the fundamental cost relationships in the management and operation of defence forces, which become evident during periods of rapid funding reductions. Fiscal year 2004-2005 is used as the baseline year for the study. The Canadian navy is used as a case study, although similar case studies could have been done for the Canadian army or air force. The Canadian navy has warships divided between the East and West coasts, with one naval base on each coast. This study reduces the number of ships, and associated base support on each coast, in a defined sequence until all ships are eliminated, and illustrates potential savings throughout this process. The study concludes that unless infrastructure, as well as the number of military and civilian personnel, is reduced as ships are decommissioned, savings are minimal.

The increasing cost of next-generation aircraft, ships and land combat vehicles, combined with rising maintenance expenses for aging equipment, places a unique set of pressures on governments and senior defence officials. Policies and programs to mitigate the effects of this ongoing central defence problem will put pressure on funding earmarked through the 2017 defence policy – *Strong, Secure, Engaged* (SSE). The medium-term consequence is that defence funding pressures, even with a stable activity rate, can continue to compound over time. The result could create a sustainability gap between required resources and available funding, despite current and historical attempts to align funding with needed resources. The most significant impact on defence since the end of the Cold War has been a paradigm shift in the utilization and management of capital equipment, which has dramatically affected the cost of sustainment of military equipment. Historically, defence forces have maintained their weapons as individual systems. The shift in emphasis to joint operations has not yet been fully accompanied by management of capital equipment by capability. To do so would require simultaneous consideration of all resource elements that constitute each capability – a daunting effort.

Defence, although an important responsibility of the federal government, is but one of a multitude of essential programs competing for limited federal resources. Resource demands on the federal government have been increasing since the gradual implementation of social democratic programs in North America, following the Great Depression in the 1930s. Aging populations in Western societies and the need to repair and replace roads, bridges, sewers, water mains and power generation infrastructure built in the middle of the 20th century are exacerbating this trend. Defence, as one of the federal government's major expenditure categories, remains a target of interest groups who advocate increased emphasis on, and funding for, other government programs.

Defence forces must make constant decisions on resource allocation in an environment where demands for resources exceed supply. Indeed, defence funding in Canada has been characterized by the enduring struggle to find an appropriate balance between funding personnel and funding the purchase of major capital equipment. Long-term stable funding is critical to military forces, due to the long lead time to design, procure and build advanced technology weapon systems. SSE addressed this problem by including a 20-year funding time frame where the funds were earmarked in the fiscal framework. The conundrum is that defence is part of a dynamic, changing environment, yet effective management of resources in defence is best achieved under moderate stability. With the need to transform the forces to address the challenges and uncertainty of 21st century conflict, while concurrently meeting shifting operational demands as well as other domestic and international commitments, the allocation of funding across this wide spectrum of responsibility has important consequences for program delivery.

Short-term fluctuations in funding can disrupt military programs and activities and the negative impact can last several years. This distinct feature of defence funding is not often sufficiently understood. In times of rapid and unplanned budget reductions, short-term decisions can be made that are not necessarily in the best interest of the long-term efficient and effective

management of the armed forces. Indeed, significant unforecasted funding reductions could produce and reinforce dysfunctional behaviour. It is relatively easy to identify and target major equipment categories such as combat aircraft, naval destroyers and a variety of army equipment types. In reality, each of these highly visible platforms is supported by a myriad of equally vital, but often unseen, infrastructure and services including maintenance facilities, training systems, personnel, computers, research and test facilities, bases and ranges, libraries and document repositories, procurement organizations, ammunition depots and communication systems. It should be noted that this support tail extends beyond the Department of National Defence (DND) itself, and includes the nation's defence industrial base complex of factories, repair facilities and outside specialist experts, plus the support defence receives from other government departments or agencies, such as Global Affairs Canada or Public Works and Procurement Canada. Defence budget reductions, to be truly effective and appropriately applied, must include reductions to various degrees in each of personnel, operations and maintenance, and capital in order to maintain a balance between current demands and building future capability.

The objective of this study is to illustrate cost relationships, in order to assist decision-making in defence. Doing so with an easily understandable fictitious example will assist senior decision-makers in defence and government to understand the implications of their decisions. The DND's Defence Personnel, Operations and Maintenance Model (DPM) is used to demonstrate the fundamental cost relationships in the management and operation of defence forces, which become evident during periods of funding reductions. Fiscal year 2004-2005 is used as the baseline year for the study, including funding, naval vessels and personnel. The Royal Canadian Navy (RCN) is used as a case study, although similar case studies could have been developed for the Canadian army or Royal Canadian Air Force. The RCN has warships assigned to both the East and West coasts, with one base on each coast. This study reduces the number of ships, and associated base support on each coast, in a defined sequence that illustrates potential savings throughout this process. The study concludes that unless the number of military personnel is reduced as ships are decommissioned, savings are minimal. The first section provides an overview of resource allocation in the Canadian defence budget, with particular emphasis on the influence of incrementalism in public resource allocation. The objective of this section is to illustrate the complexity and difficulty inherent in defence decision-making. The second section outlines the fiscal year 2004-2005 structure of the RCN, and then describes the methodology used in this study. The third section presents and discusses the results. The final section takes a broader, more conceptual perspective and develops a decision support model framework that illustrates direct, indirect and induced impacts of changes in resource allocation to defence, the federal government, industry and the economy.

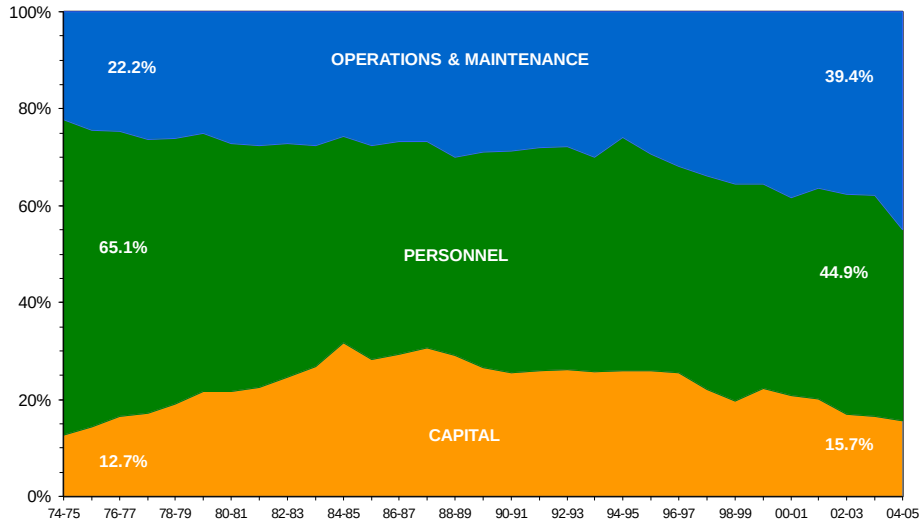
Defence Resource Allocation

A simple example effectively illustrates the impact of a defence resource allocation decision in a resource-constrained environment. Suppose that one of the 12 Canadian patrol frigates in fiscal year 2004-2005 was decommissioned. This reduction represents the equivalent of approximately

three per cent of all the major naval platforms in the Canadian navy. The question that arises from this decision is: What are the true cost savings that might be achieved through its removal? Furthermore, how much of the entire military, government and industrial infrastructure that helps keep that Canadian patrol frigate afloat owes its direct existence to this single ship, and could be cut at the same time? The immediate answer is "not much". Even without this ship, one would still need much of the supporting infrastructure. For example, the naval maintenance yards would be a little less busy, but would still need to exist to support the remaining fleet. Only in the extreme case where the Canadian navy had no major surface combatants remaining, could one consider actually closing all the dockyards, the coastal bases, the maritime component at National Defence Headquarters, and all the hundreds of other organizations that directly or indirectly support the navy. The cost relationship between operational and support units is non-linear, and not well understood at this time. This study attempts to gives some insights into the issue.

Graph 1 illustrates the trend in Canadian defence expenditure from fiscal year 1974-1975 through to 2004-2005.[1] Defence expenditure in Canada during that period was dominated by the slow growth of operations and maintenance (O&M) expenditure, at the expense of both personnel and capital. This trend reflects gradual changes to the mixture of defence expenditure over time. In addition, the shift in resource allocation is also indicative of the growing cost of maintaining fleets of weapon systems as they age.[2]

Graph 1 – Trends in Canadian Defence Expenditure



[1] Department of National Defence, "Trend in DND Expenditures 1974-75 to 2004-05," (DND Director Budget (Defence Economics Research and Analysis Section), Ottawa), 2005.
[2] Congressional Budget Office, "The Effects of Aging on the Costs of Operating and Maintaining Military Equipment," Washington, D.C., 2001.

Personnel costs are relatively inflexible in the short term. Substantial reductions in military personnel strengths take time. Severance packages have to be developed for both the military and civilian workforce, bases have to be closed and the remaining military units relocated. These changes result in significant transition costs and it can be three or four years before personnel savings start to accrue. Similarly, major capital programs with contractual commitments extending several years into the future provide limited scope to cut capital expenditure in-year. As a consequence, unplanned funding reductions in a single fiscal year must generally be absorbed by the only remaining discretionary funding – the O&M budget. This reduction in O&M expenditure can take the form of reduced military activity levels, delays in the procurement of spare parts and deferred contracted maintenance. Operations and maintenance budgets, as well, include a substantial amount of private-sector provided services, such as flying training services that are supplied through long-term contracts. A common reaction to immediate budget cuts, therefore, is to ground aircraft, park army vehicles and tie up ships, in order to achieve immediate savings. The question that results is: What savings actually accrue from taking that equipment out of service, however temporary that action may be? The fact that personnel costs and much of the capital program are fixed in the short term, and O&M expenditures include a significant component of contracted services, means that unforecasted budget reductions must all be achieved from the small, discretionary O&M component of the defence budget. The result, therefore, when decisions are made to rapidly reduce the defence budget, is sub-optimal budget cuts that disproportionately affect operational capability.

The budget process in defence is complex, with many participants, including politicians, military officers, public servants from DND and other departments, officials from central agencies, defence contractors and citizens. Achieving coherence in the management of defence resources is therefore a challenge. The gradual shift in defence expenditure points to incrementalism in Canadian defence budgeting. Incrementalism theory[3] in budgeting focuses on the often marginal adjustments to budgets from the preceding year, with little emphasis on the overall funding base. Rather than a reactive response to changing circumstances, incrementalism is adaptive. Incrementalism flows from the limited capability of individuals to analyze complex organizations, asymmetry of information and co-ordination difficulties between different parts of an organization. Of primary importance is the tendency to compartmentalize, which results in budget managers in different parts of the organization taking an unnecessarily narrow budgetary perspective.[4] Military organizations, in general, are particularly subject to compartmentalization. Indeed, a common complaint in militaries is the organizational structure that has developed into multiple "stovepipes" over the years, which reinforces the tendency toward compartmentalization. This should not be surprising. In the navy's case, for example, officers are trained and spend their initial years serving on ships and naval bases or in training establishments. Their focus naturally becomes the maritime environment. It is only later in their careers that they are likely to be posted to a headquarters or joint position to broaden their perspective and experience, in preparation for promotion to higher rank. Although joint military

[3] A. Wildavsky, *The Politics of the Budgetary Process*, 3rd edition (Boston: Little, Brown and Company, 1979).
[4] Barry Bozeman and Jeffrey D. Straussman, "Shrinking Budgets and the Shrinkage of Budget Theory," *Public Administration Review*, November/December 1982: 509-515.

doctrine has become much more prevalent and important in Western militaries, army, navy and air force organizations largely remain separate and distinct. It is noteworthy that interoperability among the three Canadian services and their American counterparts is of critical importance to Canadian defence, whether focused on the defence of North America or on international operations. Indeed, Canadian naval interoperability with the U.S. Navy is matched by few other nations. In the past, individual services had a tendency to focus on interoperability with their equivalent American service, instead of the other two Canadian environments. Although this may have been operationally driven to ensure that interoperability was maintained with American forces leading a coalition operation, national interoperability also remains critical.

Military organizations are proud of their history and traditions, and due to the nature of their business are inherently conservative. Change typically comes slowly to military forces, due to the complexity of modern military operations and the high consequence of error. History, tradition and routine have been defined as essential characteristics of incremental budgeting.[5] In an organization where compartmentalization is prevalent, the institutional reaction to budget reductions is generally percentage cuts spread out across the board. Within the Canadian Armed Forces, this is known as "shaving the ice cube". Indeed, allocating budgets in this manner is not uncommon, especially in large, complex, technology-driven organizations – although more recent practices include more directed cuts. This is in part because budgeting through incremental adjustments is an economical approach to coping with complexity, "given the limited cognitive capacity of individuals and limited problem-solving resources within an organization."[6] Furthermore, this approach offers predictability and it reduces the prevalence of internal conflict.

In a large, complex organization, decision-makers often have incomplete information regarding the consequences of decisions on other parts of the organization. Indeed, the impact of decisions on other parts of the organization may not even be a significant concern. Within national military forces, competing interest groups advocate for resources, which can result in an incoherent strategic outcome. Consequently, budgetary decisions are not undertaken in a comprehensive manner, but are made piecemeal, with budgetary changes made in minute steps based on compromises among interest groups.[7] A large number of individuals at multiple levels in defence make resource allocation decisions. In making those decisions, managers are assumed to make rational choices in such a manner as to maximize the utility of the resource expenditure.[8] Nevertheless, they each have specific interests they wish to support, and combined with knowledge limitations and incomplete information, effective decision-making may be difficult.[9] Indeed, the potential for significant rent-seeking behaviour exists in defence, given the defined funding level of the defence budget, with each service representing separate interest groups.

[5] Willie Seal, "Modernity, Modernization and the Deinstitutionalization of Incremental Budgeting in Local Government," *Financial Accountability & Management* 19 (2) 2003: 93-115.
[6] S.K. Lioukas and D.J. Chambers, "The Boundary Between Planning and Incremental Budgeting: Empirical Examination in a Publicly-Owned Corporation," *Management Science* 27 (12) 1981: 1421-1434.
[7] Allan G. Schick and Frederick S. Hills, "Size, Stability and Incremental Budgeting Outcomes in Public Universities," *Journal of Management* 8 (2) 1982: 49-64.
[8] James M. Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (Ann Arbor: University of Michigan Press, 1962).
[9] Ulrich Witt, "Economic Policy Making in Evolutionary Perspective," *Journal of Evolutionary Economics* (13) 2003: 77-94.

Furthermore, redistributive coalitions in the military are limited. Although coalitions can be formed around funding for joint capabilities that can benefit all services – such as communications or surveillance capability – to a considerable extent, expenditure continues to be directed to individual service requirements.

This section has considered several important characteristics of defence resource allocation. The defence sector has a number of very distinct characteristics.[10] Indeed, the relationship between factor inputs and outputs in the military production function is very specific. The inputs into the production function that produces defence capability include capital, labour and technology, which provide the personnel, infrastructure and equipment for national defence forces. From an economics perspective, the objective is to maximize the efficiency of these inputs. The most distinguishing characteristic of the defence budget is that flexibility in the current year may be minimal – the impact of decisions made on specific programs in future years can have a significant impact on future-year budgets. Therefore, budget decisions have a crucial long-term impact on the production of defence output. This study focuses on the immediate impact of budget reduction decisions and consequently illustrates critical cost relationships. The next section provides an introduction to the case study by outlining the structure of the Canadian navy in fiscal year 2004-2005.

Structure of the Canadian Navy

The chief of maritime staff (CMS) commands the Canadian navy. His staff is located at National Defence Headquarters (NDHQ) in Ottawa. He has three subordinate formations. One is Maritime Forces Atlantic (MARLANT), based at Canadian Forces Base (CFB) Halifax in Nova Scotia, the second is Maritime Forces Pacific (MARPAC), based at CFB Esquimalt in British Columbia and the third is the naval reserve, (NAVRES) distributed among 24 naval reserve units spread out across the country. It should be noted that the Canadian navy has only one base on the West Coast and one on the East Coast, with the NAVRES headquarters in Quebec City. The Canadian navy has 12 Halifax-class multi-role patrol frigates (FFH), four Iroquois-class area air defence destroyers (DDG), two Protector-class auxiliary oil replenishment (AOR) ships, four Victoria-class long-range patrol submarines (SSK) and 12 Kingston-class coastal defence vessels (MM). The ships are assigned fairly evenly on the East and West coasts. The navy is also supported by 28 CH-124 Sea King anti-submarine helicopters and 14 CP-140 Aurora strategic airborne surface surveillance aircraft. The Canadian navy operates under a naval task group concept, which is centred on the Canadian patrol frigate. The remainder of this section will describe the methodology used in this study.

[10] John M. Treddenick, "Distributing the Defence Budget: Choosing between Capital and Manpower," in *Issues in Defence Management*, edited by Douglas L. Bland (School of Policy Studies, Queen's University, Kingston, 1998).

Methodology

The DND's DPM is a standard cost model that estimates the full cost of resources used in each military unit in Canada.[11] The DPM starts with data from the *Cost Factors Manual* for each type of equipment, facility costs, and for military and DND personnel by rank. The *Cost Factors Manual* is a DND publication produced annually to provide a common basis for estimating DND and Canadian Forces personnel, military and civilian pattern equipment used by the department, as well as the cost of operating defence facilities. The *Cost Factors Manual* uses standard costs, which are "national average costs, based on several years of historical data of a particular resource per unit of activity", such as a flying hour for an aircraft type.[12] All costs in this study are in FY 2004-2005 dollars. Defence department databases are used annually to input actual unit personnel strengths and equipment holdings into the DPM. The result is a very good database to model resource tradeoffs or changes in force structure and activity levels.

This study uses the DPM to estimate the cost of all DND and CAF naval units in Halifax and Esquimalt. The DPM is based on the actual manning of each ship at a specific common point in the fiscal year. Therefore, the actual cost of a ship class on both coasts could be different due to activity and manning levels. To examine when and how reducing or eliminating naval vessels achieves savings, the model simulates decommissioning all the ships on each coast, with the resulting budget reductions presented graphically in this paper. This study did not include amortization of in-service equipment; similarly, the future cost of new capital procurement for the navy was not considered. Minor auxiliary vessels and small craft operated by the Canadian navy were not listed separately in this study, but were included as part of CFB Halifax's and CFB Esquimalt's support costs. Similarly, the naval reserve was not explicitly part of this study; however, the salaries of the reservists who operate the 12 Kingston-class coastal defence vessels were included in the ship costs where appropriate.

This study examines the categories of operating costs, civilian DND employee salary costs, CAF military personnel costs and fixed costs. The results are displayed graphically using the category groupings of operating costs only, operating costs and civilian DND employee costs, and finally, operating costs, civilian DND employee costs and military personnel costs. In this study, the costs of supporting organizations are deemed to be fixed. Support costs in Halifax and Esquimalt include all base costs, the fleet maintenance facility and formation headquarters on each coast, as well as the naval operations and engineering schools in Halifax. The fleet maintenance facility is a DND owned-and-operated facility that provides comprehensive maintenance and repair services for all Canadian naval vessels. All CFB Halifax costs in support of the army or air force were removed, as were funds expended in support of the cadet youth program.

Operating costs include materiel, petrols, oils and lubricants, as well as engineering services. Civilian and military personnel costs include direct costs, which are salaries and corresponding government contributions to statutory programs authorized through legislation, such as Canada

[11] Department of National Defence, The Department of National Defence Personnel, Operations and Maintenance Model 2004-2005, (DND Director (Strategic Finance and Costing), Ottawa, 2005).
[12] Department of National Defence, *Cost Factors Manual*, 2004-2005 edition (Director Strategic Finance and Costing, Ottawa, 2004).

Pension Plan payments. Indirect personnel costs, such as air crew or sea duty allowances, professional fees and severance pay are also included.

The capability of each type of ship class is different. Indeed, the capability of a ship is not absolute, but relative. In a naval context, capability is defined as a ship's ability to undertake certain tasks in a defined maritime environment, with a certain likelihood of success. Capability of naval vessels can depend on how the ship is used and the operation in which it is employed. Nevertheless, different capabilities of naval vessel classes must be acknowledged. In this study, weighted averages and variable cost ratios for the naval vessels were derived from the 2004-2005 *Cost Factors Manual*.[13] The ratios derived for naval vessels were then used to apportion variable costs per ship in terms of operating costs, civilian personnel costs and military costs.

Cost savings possible from the reduction or disbandment of operational units can be obtained from the DPM. Savings achievable from support organizations, such as military bases, are not as clearly defined. Reductions of support organizations do not occur on a linear relationship with operational units. For example, CFB Halifax has one fuel testing facility. This facility is required whether one ship or 18 are based out of that naval base. Other support functions, such as warehousing, or the fleet maintenance facility, can reduce staff in a step-variable function, as the number of ships supported declines. Given these factors, this study did not allocate any fixed cost savings to the first several sequences of ship decommissioning. The final sequence was allocated a 70-per-cent reduction in fixed support costs, preceded by a series of smaller reductions in the latter decommissioning sequences.

This study examined 18 ships on the East Coast and 14 on the West Coast. Ship decommissioning in this study was not completed by a series of individual single ship reductions, but by decommissioning groups of ships so as to reduce or eliminate a naval capability, while preserving the task group concept under which the Canadian navy operates. The decommissioning sequence, on each coast, is listed in Table 1.

Table 1 – Ship Decommissioning Sequence

	MARLANT		**MARPAC**	
Sequence Order	**Ship Class**	**Number of Ships**	**Ship Class**	**Number of Ships**
1	Iroquois class	2	Iroquois class	1
2	Kingston class	3	Kingston class	3

[13] Department of National Defence, *Cost Factors Manual*, 2004-2005 edition (Director Strategic Finance and Costing, Ottawa, 2004).

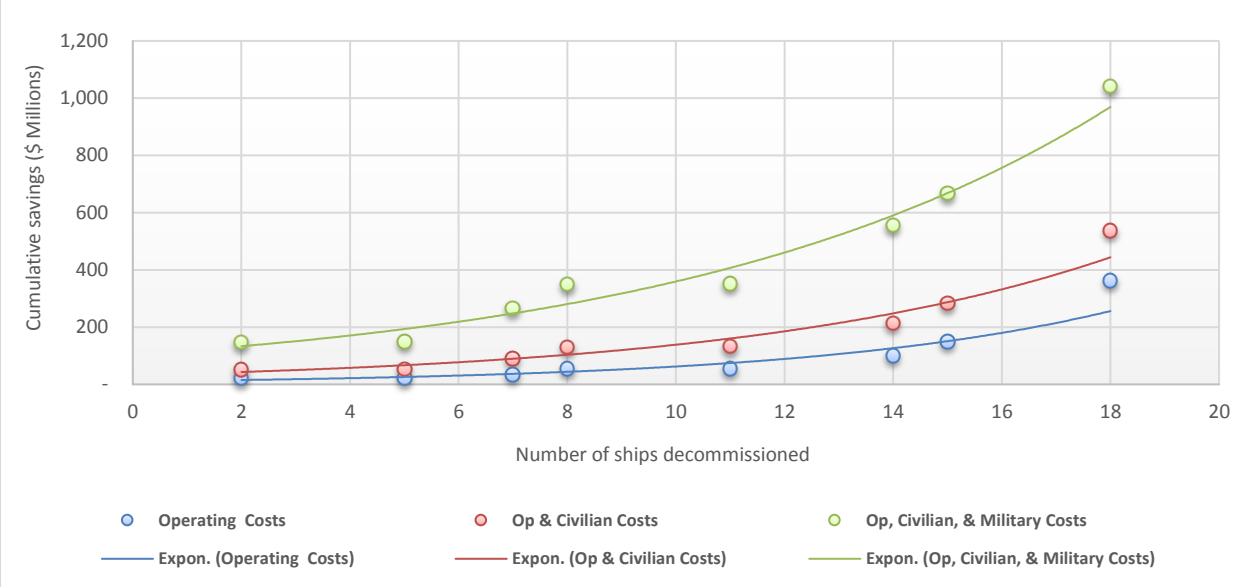
3	Halifax class	2	Halifax class and 5% of fixed costs	2
4	Victoria class and 5% of fixed costs	1	Kingston class	3
5	Kingston class	3	Victoria class and 10% of fixed costs	1
6	Halifax class and 10% of fixed costs	3	Halifax class and Protector class and 85% of fixed costs	2 1
7	Victoria class and 15% of fixed costs	1		
8	Halifax class and Protector class and 70% of fixed costs	2 1		

The Iroquois-class area defence destroyer HMCS Huron was not in service, and consequently not included in this study. The study is based on fiscal year 2004-2005 equipment and personnel data. The Victoria-class submarine HMCS Chicoutimi was transferred to the RCN from the British navy in October 2004 and was consequently not included in the study.

Cost Reductions From Canadian Navy Ship Decommissioning

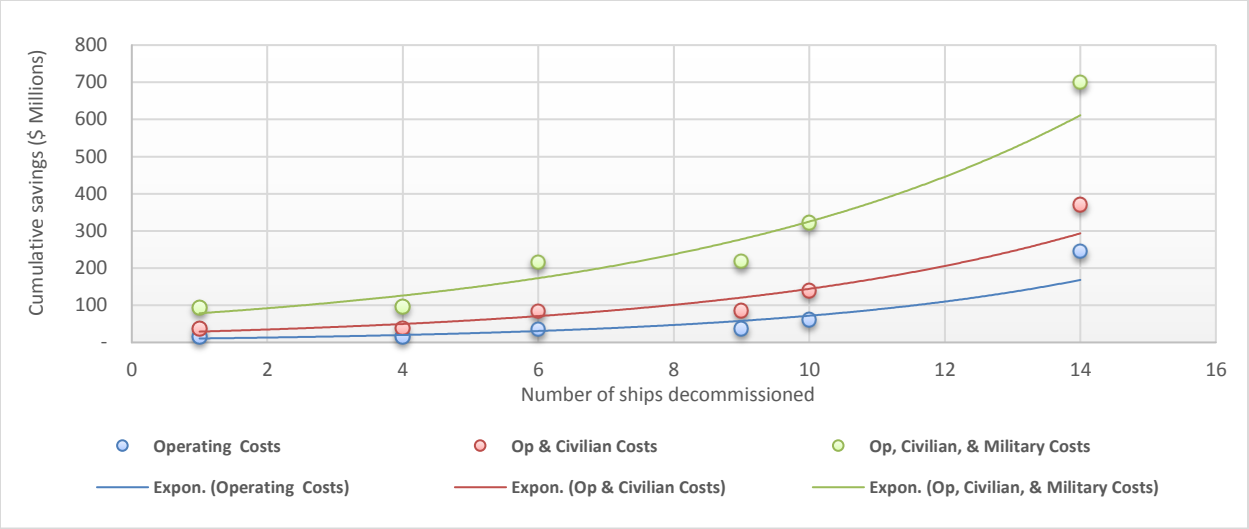
Graph 2 illustrates cost reductions possible from the decommissioning of all Canadian naval ships on the East Coast (MARLANT). The variable costs of each ship in a sequence are eliminated in the sequence specified in Table 1. Fixed costs are reduced in sequences four through eight. The five-per-cent fixed cost reduction in sequence four recognizes the lower requirement for ship maintenance personnel at that particular stage of ship decommissioning. The 10-per-cent fixed cost reduction in sequence six accounts for the elimination of the Kingston-class coastal defence vessel fleet in the preceding sequence and a significant reduction of the Halifax-class frigates in that sequence. Sequence seven decommissions the last remaining submarine on that coast and apportions 15 per cent in fixed costs to that sequence. The final sequence decommissions the remaining two Halifax-class frigates and the Protector-class auxiliary oil replenishment ship, while eliminating the remaining 70 per cent in fixed costs.

Graph 2 – Decommissioning of MARLANT Ships



Graph 3 illustrates cost reductions possible from the decommissioning of all Canadian naval ships on the West Coast (MARPAC). The variable costs of each ship in a sequence are eliminated in the sequence specified in Table 1. Fixed costs are reduced in sequences three through six. The five-per-cent fixed cost reduction in sequence three recognizes the lower requirement for ship maintenance personnel at that particular stage of ship decommissioning. The 10-per-cent fixed cost reduction in sequence five accounts for the elimination of the Kingston-class coastal defence vessel fleet in the preceding sequence and a Victoria-class submarine in that sequence. The final sequence decommissions the remaining two Halifax-class frigates and the Protector-class auxiliary oil replenishment ship, while eliminating the remaining 85 per cent in fixed costs.

Graph 3 – Decommissioning of MARPAC Ships



Observations

Graphs 2 and 3 illustrate that the most significant cost driver in the Canadian navy at the formation level is military personnel costs. In effect, despite the significant cost of using large capital-intensive weapon systems, the armed forces remain an activity dominated by the need to recruit, train and maintain the skills of soldiers, sailors and air personnel. Fundamentally, the armed forces remain a people business. Indeed, in MARLANT, decommissioning all naval vessels on the East Coast without affecting personnel costs only cuts expenditures by 28 per cent. Military salary costs alone account for 54 per cent of MARLANT costs. Consequently, unless military and DND civilian positions are eliminated during any funding cuts, only marginal savings will accrue. What is most striking about the ship decommissioning graphs is that a large number of naval ships need to be taken out of service in order to generate substantial operating savings. Specifically, on the East Coast, tying up 14 of 18 ships to reduce operating costs only saves eight per cent of total funding. Thus, elimination of the majority of operational capability on that coast only provides minor savings. Even if DND civilian and military personnel costs were included, the savings would only amount to just over half of MARLANT costs. Indeed, 34 per cent of all costs are eliminated in the last sequence. This study has examined funding reductions from the perspectives of operating costs, civilian DND employee salary costs, CAF military personnel costs and fixed costs. The operating costs, the smallest of all these perspectives, represent the costs which include a substantial portion that could be reduced quickly.

This study illustrates that marginal – even sometime substantial – cuts to a capability only return marginal savings. In order to achieve the greatest return when cutting defence budgets, the most effective cost-saving strategy is to eliminate entire capabilities. It is only when an entire capability and associated support structure, including personnel, are eliminated that certain fixed costs can

be cut. The operational impact this would have on the armed forces is beyond the scope of this study.

Decision Support Model Framework

The preceding section illustrated the impact that reductions in the number of in-service ships would have on operating expenses, as well as on civilian and military personnel costs. This final section takes a broader, more conceptual perspective and develops a decision support model framework that also includes several important affected groups outside defence. The study of the Canadian navy focused only on the financial impact of reduced equipment and personnel on the DND and CAF. This, however, is only one of several affected categories in such a cost-reduction scenario. From a corporate perspective, reductions to the Canadian navy would also impact the federal government, industry and the economy.

The decision support model framework for reductions in major equipment fleets and personnel is listed in Table 2. The preceding study only considered direct costs to the DND. This table presents the information in economic terms and highlights the significant costs, or savings, that could also accrue through the less evident indirect or induced impacts. Nevertheless, the common characteristic of these three distinct impacts is that the financial and human resource implications are felt throughout the framework to some extent. Not included in this table is the negative multiplier effect that will occur as the impact of reducing the Canadian naval fleet cascades through the economy.

Table 2 - Decision Support Model Framework

	Direct Impacts	Indirect Impacts	Induced Impacts
Cost to DND	- DND and CF member wage losses - Military and civilian severance payments - Reduction of local base budgets - Decrease in grants in lieu of taxes to local municipalities	- Reduced employment by companies employed by the local base - Decline in benefits arising from money spent by the base and its suppliers	- Reduction of spending by employees (households) on consumer goods and services
Cost to Canada (Federal Government)	- Income tax, Goods and Services Tax and indirect tax losses - Increase in transfers to individuals (Employment Insurance and welfare payments)	- Environmental clean-up costs - Upgrade of surplus base infrastructure for hand-over to local organizations	

	- Retraining and relocation of affected employees		
Cost to Industry	- Output forgone - Reduction in profits resulting from reduced sales to the base - Severance payments to laid-off employees	- Reduced economic activity - Decline in demand from a major customer	- Decline in investments in plant and equipment
Cost to the Economy	- Reduction in residential and commercial property values	- Reduction in goods and services provided in the community	

The DND and CAF experienced massive budget cuts in the 1990s. The DND conducted numerous studies to measure the socio-economic impact of those reductions on affected communities, regions, provinces and nationally.[14] Indeed, the impact of military base reductions and their associated units on their immediate community is not insignificant. A 1994 DND study of socio-economic impacts on 43 bases, stations, camps and detachments found that CFB Halifax had a 6.7-per-cent impact on income in the local community. This included direct and first-round indirect impacts on the host community income. CFB Esquimalt had a 5.2-per-cent impact on host community income.[15] A subsequent study, commissioned by DND, also examined the socio-economic impacts of military installations across Canada.[16]

Table 3 – Estimated Economic Impacts

	West Coast (British Columbia)	**East Coast (Nova Scotia)**
Cost to DND	$700M	$1,040M
Cost to Federal Government	$200M (over 5 years)	$300M (over 5 years)
Cost to Industry	Dependent on government industrial strategy	Dependent on government industrial strategy
Cost to the Economy	-0.35% of GDP (British Columbia economy)	-2% of GDP (Nova Scotia economy)

[14] Tracy Wait and Louis Parai, "The Socio-Economic Impacts of Military Installations on their Host Communities: An Update – Operational Research and Analysis Project Report 682," Department of National Defence, Ottawa, 1994.
[15] Ibid.
[16] KPMG, *Socio-Economic Impacts of Military Installations and Selected Components on their Host Communities* (Ottawa: KPMG, 2000).

Table 3 provides an estimate of economic impacts of the illustrative naval reductions discussed in this paper. Some of the impacts are direct and relatively easy to observe and quantify. The implications of prior socio-economic studies on CFB Halifax and CFB Esquimalt are that direct impacts of defence expenditures are the most significant by a considerable margin,[17] and indeed are the closest scrutinized; yet indirect and induced impacts must also be considered. Nevertheless, when defence or government officials make decisions, it is generally on the basis of direct costs. Indirect or induced impacts are more difficult to observe and measure. Furthermore, actual costs could vary, dependent on such variables as the ability of affected personnel to obtain other employment.

The cost to DND is derived from the DPM and is reflected in graphs 2 and 3. The cost to the federal government is derived from estimated social and other adjustment costs, including Employment Insurance and environmental clean-up costs. Adjustment costs could be incurred over a five-year period. The cost to industry could vary depending on the federal and provincial strategies put in place to mitigate the effects of any defence funding reduction. The estimated GDP decrease of 0.35 per cent in the province of British Columbia and two per cent in Nova Scotia indicate the greater dependence on defence expenditure in the smaller economy on the East Coast.

Conclusion

This paper has examined the financial savings that could accrue if the entire Canadian naval fleet on both coasts were decommissioned in a sequential manner. The result is that significant savings do not materialize unless both military and civilian personnel are also reduced correspondingly. Nevertheless, substantial fixed costs will remain on each coast until all ships are decommissioned. The consequence is that governments or defence planners wishing to derive substantial savings through decreased activity levels, or through operating a smaller number of major weapon systems, will only obtain marginal savings until entire capabilities are eliminated. Future work should focus on apportioning the cost of the chief of maritime staff in Ottawa, as well as the director general of the Maritime Equipment Program Management (DGMEPM) organization in the assistant deputy minister's office (materiel), and also add applicable cuts to the national procurement budget to the reductions on each coast.

[17] Wait and Parai, "The Socio-Economic Impacts of Military Installations on their Host Communities ..."

About the Author

Ross Fetterly *retired in 2017 from the Canadian Forces after a 34-year career as the Royal Canadian Air Force's director of air comptrollership and business management. He previously served as the military personnel command comptroller, and in other senior positions with the Department of National Defence Assistant Deputy Minister (Finance).*

Retired Col. Fetterly completed a tour in February 2009 as the chief CJ8 at the NATO base headquarters at Kandahar airfield, Afghanistan, where he was responsible for finance, contracting and procurement. While deployed he wrote a paper entitled Methodology for Estimating the Fiscal Impact of the Costs Incurred by the Government of Canada in Support of the Mission in Afghanistan with staff from the Parliamentary Budget Office. Col. Fetterly was employed as the deputy commanding officer of the Canadian contingent in the United Nations Disengagement Observer Force in the Golan Heights during the second intifada in 2000-2001. He has served as an air force squadron logistics officer and as a finance officer at military bases across Canada.

An adjunct professor at the Royal Military College of Canada (RMC) department of management and economics, and a Senior Fellow with the Centre for Security Governance, Dr. Fetterly has a B.Comm (McGill), M.Admin (University of Regina) and an MA and PhD in war studies from RMC. His PhD fields of study included defence economics, defence policy and defence cost analysis. His primary research focus is defence resource management. Dr. Fetterly also teaches courses in financial decision-making, defence resource management and government procurement at RMC. Through his company, Ross Fetterly Consulting Inc., he teaches a defence resource management course and a business planning course internationally for the Department of National Defence to senior military officers and defence executives in developing countries.

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