

EVALUATING GROWTH PROPOSALS

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April 1975

WP-75-33

This paper was prepared for a Conference on Growth Centres and Development Policy sponsored by the Government Studies Programme of Dalhousie University, Halifax, Canada, April 10-11, 1975

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Professor Foster's invitation to this symposium hinted pretty strongly that he would like me to say something trenchant about continued federal fiscal responsibility, after the initial pump-priming, in a growth centre strategy. At the time I quite happily agreed. Later reflection, however, convinced me that this was not one of the key questions for the Halifax region nor in fact a very important one at all. What I propose to discuss instead is *a structured way for a community to study and debate its future*. The twin assumptions, that the future is malleable in important ways -- "ours to design" -- and that its designers ought to be the present residents, are now part of the conventional planning wisdom. Just how far they are (or ought to be) true, though, is still a good question. Part of this paper has to do with shortcomings in present ways in which communities now study their futures, especially in the more analytic methods propounded by fellow professionals, and with suggestions for alternative approaches. Along the way, and in the blissful absence of real data, I shall mention aspects of some potential futures that may be disquieting and maybe mildly provocative, and allude from time to time to intergovernmental finance.

The heart of the argument is that every alternative proposal for this region's future ought to be examined for its *feasibility*, its *implications*, and *community valuations* of those implications; and that in addition to the interests of the groups party to the decision, a prudent community will sequentially evaluate a proposal in terms of *resilience*, *equity* and (only then) *efficiency*. The order is important. There is little sense in arguing about the desirability of infeasible policies or unattainable goals. Structuring the learning process in this fashion allows many more options to be addressed with the same resources of community time and energy.

Most of the rest of this paper is concerned with explaining the italicized words above. Let me begin by defining one of the many possible alternative futures of the Halifax-Dartmouth metropolitan region as an exemplary straw horse.

Halifax as Growth Centre: Example of a Proposal

There has been advocacy for many years in favour of making the Halifax urban region into a (or the) major growth centre of the Maritimes. Of course, ever since the famous Halifax Encounter, very different views of the preferred future have been part of the public debate. For the sake of exposition, however, I shall elaborate the growth centre alternative. This vague term usually includes at least three components. (1) Halifax should not suffer outmigration. A minimal criterion for population change is that it exceed the rate of natural increase; more likely, the rate of population growth would approach that of other large and prospering Canadian cities. (2) Per capita incomes should rise even faster than population, approaching or exceeding national norms in a decade or so. (3) In consequence, the Halifax-Dartmouth metropolitan region should increase its present dominance of its Maritime hinterland; and the region as a whole, through the medium of a large and vigorous capital city, should grow in influence and stature in the affairs of the nation, while enjoying the benefits of the latest fashions in technology and culture. Key to the implementation of this glowing future is the concerted and deliberate manipulation of policy instruments by the two senior levels of government.

On the first criterion, population growth, natural increase alone is unlikely to take the metro-area population much above 300,000 in the remaining 25 years of this century, especially if recent fertility declines persist. Let us quite arbitrarily say, then, that a target population of 340,000 by the 2001 Census would comfortably satisfy the population goal.* Satisfying the second criterion would imply the creation of about 35,000 new jobs over that period, with a growth in real wage rates of

* This figure may be compared with the forecasts made for the Lithwick Report, probably the best urban population forecasting study yet done in Canada, but unfortunately completed before 1971 Census results were reported, and just before the dramatic continent-wide drop in fertility became apparent. It is thus not surprising that only one of their conditional forecasts falls below the number I have picked as indicating genuine growth:

Series I	A	421,000
	B	325,000
	C	546,000
Series II	Pref	843,000
Series III	Pref	444,000
Series III	H	492,000
	M	444,000
	L	407,000

Source: (8), Tables 19, 23, and 24.

something like six percent per year, on the average over all jobs. In these parlous times, no one ventures to predict very confidently what the rest of the economy is likely to do, but it is probably safe to say that a sustained real income growth rate of six percent would be sufficient to satisfy the relative wealth criterion.

Feasibility

How reasonable is such a scenario? One of the major points I want to make is that the planning literature, as well as planning practice, is woefully weak in useable ways of answering that question; and in consequence, a lot of energy is wasted in fruitless debates about unattainable options. With respect to the growth trajectory suggested by our hypothetical example, the first observation on feasibility is that Halifax-Dartmouth is a component of much larger systems. That excess of 40,000 immigrants over emigrants has to come from somewhere, and it is convenient to think of the possible origins as being the local hinterland, the rest of Canada, and the rest of the world.

In Canada as a whole, it is not overexaggerating to say that the urbanization process has more or less ended, in the sense that the great migrations from farm to city have already taken place. There are no longer great reservoirs of technologically underemployed labour in our rural regions, though of course there remain puddles in various places.* On the contrary, there are indications, in the energetics of farming (16) and in the manifest preferences of urban Canadians for the tranquillity of rural Maritime retreats, that the non-metropolitan population of Nova Scotia, at least, may be approaching its all-time historic low in the next decade or two. Time will tell, but in any case, rural and small-town Maritimers will not provide any important fraction of the incremental population** -- especially if the income target is maintained.

* By Census definition, Canada this year is about 80 percent urban, while the Maritimes are only about 60 percent. The difference corresponds to about 25 years of demographic history (17), though there are good reasons for speculating that the Maritimes will never be as urbanized as the rest of Canada -- and that Maritimers will be the happier therefor.

** The point is emphasized by considering the nature of urban growth by migration. Capturing a net gain of 40,000 means that the several hundred thousand persons who will migrate to Halifax over these three decades will exceed the almost-as-large number leaving by 40,000, less the natural increase of the migrant population while in Halifax. Migrants are highly volatile. (Cont'd)

International migration is likewise unlikely to provide a major new source of Halifaxians. As the Lithwick Report (8) showed, new Canadians are overwhelmingly likely to lodge in the biggest cities. Indeed, one of the most interesting implications of the studies organized by Lithwick in 1969-71 was that more than 60 percent of the growth of Montréal, Toronto and Vancouver was likely to be accounted for, during 1971-2001, by international migrants and their children, in the absence of policy changes. That realization in turn spurred renewed Federal interest in immigration policy, as evidenced by the current Green Paper. Thus there are two factors mitigating against any large number of new Canadians settling in Halifax: first, such migrants are more likely to choose large (and perhaps English-speaking (17)) entrepot cities, and second, the absolute number of immigrants may well decrease somewhat in response to Federal policy initiatives predicated in part on the strain such migrants impose on the already congested big metropolitan regions.

The final source, and probably the only really major one for Halifax, is the rest of urban Canada. For large metropolitan areas in the coming post-industrial world, the major sources of population change will be, for the first time since the Industrial Revolution, locally generated natural increase (most importantly) and migration from other metropolitan regions. The goals of a growth centre strategy for Halifax, then, must be consistent with the dynamics of the rest of the Canadian urban system. If the 22 Census Metropolitan Areas with 1971 populations exceeding 100,000 in 1971 be accepted as a reasonable approximation of the Canadian urban system, the present and the desired future of Halifax can be set in a system-wide context in the manner shown in Figure 1.

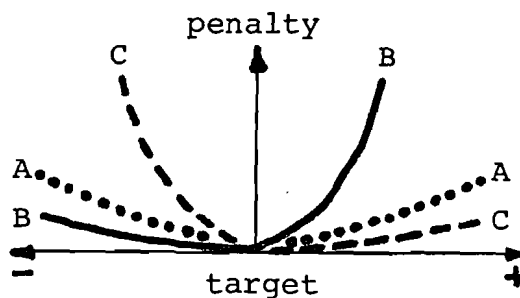
The second column of Figure 1 is neither a forecast nor a prediction. Rather, it represents a desired figure, a target. For present purposes it does not matter how these numbers are generated. Conceivably they could be an aggregation of 22 local plans, or a set of goals held by some central agency. This particular set was in fact made up out of whole cloth by Ross MacKinnon and myself for the

(Cont'd.) If one thinks of a national pool of potential migrants, then the growth of particular places will depend heavily on their attractiveness for members of that pool. Current work at IIASA and the Center for Environmental Studies in London (3, 4) is concerned with elaborating the implied policy consequences for sets of regions with equal escape frequencies and differential capture.

Figure 1: Hypothetical 2001 Population Goals for 22 Canadian Census Metropolitan Areas

CMA	1971 pop. (000's)	2001 pop. (000's)	Prio- rity	Penal- ty*
Calgary	403	650	6	B
Chicoutimi-Jonquièrè	134	260	3	A
Edmonton	495	1000	8	B
<i>Halifax</i>	<i>223</i>	<i>340</i>	<i>9</i>	<i>C</i>
Hamilton	498	580	5	B
Kitchener-Waterloo	227	500	6	B
London	286	450	5	A
Montréal	2753	4200	7	B
Ottawa-Hull	603	900	7	B
Québec	481	700	7	C
Regina	141	200	7	C
St. Catharines	303	380	4	B
St. John's, Nfld.	131	220	8	C
St John, N.B.	107	190	6	C
Saskatoon	126	210	8	C
Sudbury	155	190	2	A
Thunder Bay	112	240	5	C
Toronto	2628	4700	7	B
Vancouver	1082	1750	9	B
Victoria	106	400	7	B
Windsor	258	380	2	A
Winnipeg	540	800	7	C
	11792	19240		

- * A: symmetrical penalty function
- B: large penalty for positive deviation
- C: large penalty for negative deviation



Source: Unpublished work of R.D. MacKinnon and Yu. Evtushenko, International Institute for Applied Systems Analysis, Laxenburg, Austria

purpose of running some experiments. The "priority" column is a likewise fictitious and non-ratio set of judgments about how important it is, all things considered, that the target figure be achieved, given the type of penalty function for the case. The last column indicates that the consequences of missing the target vary for different places. For the large and fast-growing cities, it is worse to overshoot than undershoot (type B). Medium-sized cities with problems of perceived stagnation have a reversed penalty function, C. For only a few is the penalty symmetrical.

Recent research at IIASA and the University of Toronto (5, 15) has focussed on new applications of normative models for policy evaluation. Beginning with simple Markov models and going on to control theoretic and mathematical programming approaches, MacKinnon and his colleagues have in a sense inverted the usual "design-the-optimal-solution" uses of these methods to explore how difficult or easy it is, using the system's own dynamics, to arrive at a given set of goals (or trajectories over time). Numerical experiments using a non-linear programming algorithm developed by Yuri Evtushenko are going on in Laxenburg this week on models of migration processes using these and analogous data in the specification of objective functions. Last week, Raman Mehra derived an elegant analytic solution, so we now have two operational techniques. Both will be documented in full in forthcoming IIASA publications. Suffice to say at this point that Evtushenko's computer technique is more amenable to complex and highly constrained situations, while Mehra's recursive equation systems give the duals directly, thus simplifying sensitivity analysis. Each run of the 22-variable, 5-period problem in Figure 1 using Evtushenko's approximative method on a PDP 11/45 takes about ten seconds; hence, one of the prime criteria for research in a policy context, timeliness, can be easily satisfied.

To recapitulate: feasibility is a continuous dimension analogous to, but more general than, money cost. Attaining social goals may be easy, difficult, or in extreme cases impossible. In this context, "easy" means using the system's own inherent dynamics to best advantage; "difficult" means that relatively sweeping controls or rule changes are needed to change the behaviour of the people who are the ultimate elements of the system being modelled. "Impossible" means that no manipulation of the system's dynamics can produce the desired result. The utility of the kind of feasibility study advocated here lies in its corrective feedback on goal formulation or model specification. Unlike the large, detailed models which have been the cause of so much grief in urban studies (1, 14), these simple aggregative models can give rough but robust esti-

mates of the feasibility of many different proposals in a short period of time. They are not optimal models in the usual engineering or economic sense but rather a first screen or filter for reasonableness, so that later detailed analysis can concentrate on alternatives where there is liable to be some payoff. Were this conference two weeks from now, I could report some crude numerical results on the reasonableness of various population trajectories for Halifax, based on alternative scenarios of the demographic development of Canada. Interested parties are invited to keep in touch.

Implied Effects

The standard paradigm for good planning insists that, for proposals taken seriously, a full list of their consequences be set down. Clearly this is meant to include all effects that can be foreseen, not just those positively valued by the proponents. Drawing out these lists and giving some rough quantitative estimate of their magnitude and incidence calls for an omniscient but dispassionate systems analyst; the rarity of such creatures is one of the reasons policy research has not advanced all that far since the days of the great Florentine father of the profession. It is here that the dialectical processes of mutual learning that characterize the best policy debates, and which constitute the core of a remarkably wise new book by John Friedmann (7) come into play. I shall not labour the obvious, but merely list in no particular order (Figure 2) a non-exhaustive set of things that might well happen if Halifax followed the growth scenario suggested.

A growth centre strategy means qualitative change, something more than mere allometric growth, through the deliberate introduction of activities that would not normally exist there (or exist in the same magnitudes). Thus it seems to me that the consequences and side effects we should be particularly wary about are the ones arising from discontinuities and points of inflection in social process. Most of the things in Figure 2 are the standard items readily predictable by any journeyman econometrician: lowered age structure, higher service demand, a boom in housing and other construction, smog and other evidences of environmental overload. But I have also tried to suggest a few more subtle and less predictable changes in mood and values that may well accompany the achievement of the strategic goals. The more Halifax succeeds in capturing floaters from the national migrant pool, the more like other successful cities (Toronto, Calgary, Vancouver) it would become. The cultural geography of the nation would be the poorer for the lessened diversity. Many of the discords that could attend growth, however, would be focussed on small but highly visible local events. In

Figure 2: Some possible consequences of a successful growth center strategy

Halifax population becomes younger, better educated, better paid, and slightly more female, taking on the characteristics of the new arrivals and retaining a few more of the young who would otherwise have gone to Toronto.

Demand for services rises: schools, sewers, roads, galleries, museums, public transit, and parks are all found wanting sooner.

Housing prices, a perennial Halifax horror, start to really climb. Extensive renewal is needed. Much of traditional Halifax disappears or is threatened.

Most of the new jobs are in the service and quaternary sectors; a few precision manufacturers locate here, but not many and their multipliers are felt elsewhere. Wages in the new sectors have to be very high if the average is to hit the target. A dual economy?

Environmental advantages, banked on by the growth strategists to help attract employment, erode under the press of new bodies. Outraged local groups join others in Victoria and Toronto demanding an end to growth.

Citadel Hill, an insignificant mound in a forest of high-rises, is rarely seen through the smog anyway.

Old families lose their social hegemony.

"Neighbourhood" and other expressions of territorial community disappear in favour of class- and interest-based "communities without propinquity".

Halifax finds itself higher on the hierarchy of innovation diffusion, with all the emphasis on fast pace, fashion, trendiness and trivia that goes with it. Rumours now start here, instead of winding up here.

Size and wealth, and changing tastes, bring new arts centers, various bohemians, exotic restaurants whose quality sometimes matches their prices.

There are growing problems of drug use, street crime, and teenage anomie.

In 1997, the Mayor calls Halifax "the San Francisco of the Atlantic" with a perfectly straight face

housing, for example, one could expect the sort of slum whitewashing that has rehabilitated many old neighbourhoods elsewhere, over the protests of the poor who get priced out of their own market. In Trefann Court and other areas of Toronto, in Washington's Georgetown and Chicago's Old Town, in the Kitsilano section of Vancouver, the process has made money for middle-class entrepreneurs at the expense of the resident poor. Insofar as growth encourages the spreading of the income range, the public finance burdens of relieving the losers will tend to grow much faster than the average rate of regional economic expansion. But of course there would be a larger well from which the necessary revenues could be drawn. And so it goes.

Valuation: problems of equity

The fundamental political problem is of course not the aggregate effects of a policy change but their redistributive incidence: who gets, and who pays? If costs and benefits are generalized from dollars to utility, then decision theory tells us that, having exhaustively and in a perfectly unbiased fashion described all the effects of the proposed action -- Figure 2 is but a parody when set against such a standard -- all the interested groups who will be party to the decision should attach value judgments to each and every outcome, jointly where necessary. Nor is the final choice merely an easy summation, for there are of course substantial problems of weighting, uncertainty over outcomes, discounting rules, and criteria for equity. Since the attributes of the outcomes are only imperfectly known, and possibly dependent on nature and sequence of moves in the decision process itself, employment is guaranteed for a long time for game theorists and decision analysts. At bottom, though, the vast and powerful literature of decision theory offers no clear guidelines about two crucial problems: deciding whose values ought to get applied, and dealing with intertemporal trade-offs where a monetary numeraire is not appropriate.* The fact that these ethical questions are trans-scientific is no help to a community and its harassed planners and politicians.

To illustrate, ask whether in the case of deciding upon a particular future for the Halifax region, there

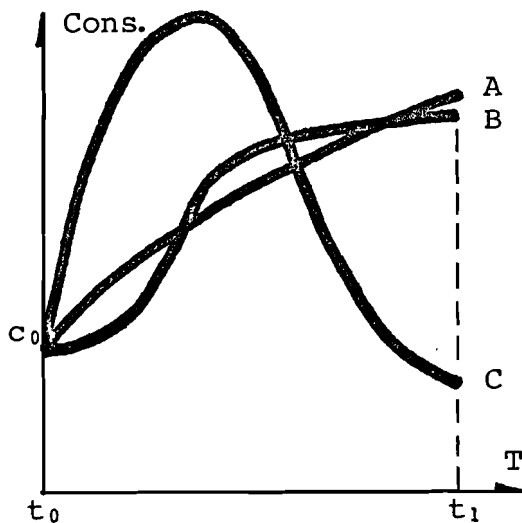
* The elegant prescriptions of mathematical economics for optimal growth with or without exhaustible resources deal only with situations where all values can be expressed monetarily (cf. 13). No such cool calculus is possible where the valuta include human lives, the extinction of biological species, and other irreversible events.

would be unvoiced interests. Assuming that democracy is alive and well in Halifax, and that senior governments would hardly act without the warm encouragement of the local governments, there is at least a mechanism through which every concerned Haligonian can assert his interests. But there are at least three classes of concerned people who do not have a realistic possibility of participating.

First, there are the rural and small-town Maritimers so airily dismissed above. Insofar as a growth strategy focussing on Halifax pre-empted possibilities for beneficial change in their own communities, they would be worse off. Niles Hansen (9) has already indicated that the evidence for the trickling down of employment benefits is less than overwhelming, unless people live within commuting range of the growth centre. As with urban housing, owners of real estate may reap speculative gains, in this case by selling scenic shorelines or fine old farmhouses to the newly wealthy weekenders from Halifax at ever more inflated prices. Effects on this group of people will in the aggregate be mixed, subtle, but hardly negligible in total. Since it is hard to conceive of organized political pressure from from these largely inchoate interests being brought to bear on the provincial government(s), their voice in the decision may be weaker than the straight merits, or magnitude of impact, might indicate.

That is even more true for the second group of interested but absent parties: the U.S. tourists and other Canadians -- ex-Maritimers, many of them, with fond memories and ties of emotion to half-idealized landscapes of a generation before -- who value the uniqueness of Halifax among the increasingly homogenized urban cultures of North America. Moreover, even though these people may never visit Halifax, they derive satisfaction from its mere existence. In other words, somewhere "out there" is a very large number of people, each of whom feels mildly that it would be nice if Halifax retained as much of its historic and cultural identity as possible. The aggregate weight of feeling in that population may be truly large, but since mild nostalgia is never a base for a political movement, these sentiments are unlikely to affect the course of events very much.

For the spatially separated there remains at least a theoretical possibility for direct involvement through established political mechanisms. This is hardly the case for the temporally separated, those future residents, migrants and local products alike, whose quality of life may be much affected by decisions taken now. Note that predicting the valuations that this potential interest group might place on present choices can be no more than idle.



Rather, the general choice is between consumption now and consumption later. But the standard rules (13) break down when the time periods are longer than the half-lives of human beings. From whose point of view is the curve A in Figure 3 optimal, if $t_1 - t_0 > 100$ years and the area under all curves is equal?

Figure 3: Hypothetical Consumption Streams

Resilience

It is due to the inevitability of conundrums like these that we are trying to give operational relevance in urban affairs to the concept of resilience, as developed by ecologists to guide the management of living systems. C.S. Holling and his colleagues, inspired by stability theory in mathematics and by some empirical singularities in nature, has argued that resource managers should be more concerned with the domain of stability of the system in question than with maintaining an artificially stable optimal equilibrium. Most human interventions in ecosystems have only small effect on the loci of equilibria, but large ones on the boundaries of the stability domain, thus increasing the probability that stochastic processes may suddenly flip the system into wholly new, unpredictable, and possibly disastrous stable behaviours (6, 10).

This pioneering work has actually been applied in the control of the New Brunswick spruce budworm (e.g., 11) and studies of the North Pacific salmon are underway. So far, however, it remains but a richly suggestive analogy in the more complicated field of urban studies. Following the lead of the biologists (12), some work is going on to develop new areas of non-classical mathematics in order to have a more natural modelling language for processes characterized by singularities, divergences, cyclical behaviour, and the like (e.g., 2), but much remains to be done. In terms of policy recommendations in actual cases, only subjective and intuitive interpretations can be hazarded at this point (18). In summary, and with the development policy of Halifax in mind, these would be as

follows:

(1) In the face of the inevitably unexpected shocks from the turbulent environment, design policies so that the equally unavoidable system failures are non-catastrophic: safe failure rather than fail-safe. This means *diversity, autonomy, and dis-integration: the technology of the small*, wherever possible. It means letting a hundred experimental flowers bloom -- and having the institutional capacity to learn from them: a learning, monitoring mechanism, with the competence and independence to report the blunders as well as the successes.

(2) Plans should stress resilience and robustness, even at the expense of efficiency or cost-effectiveness in any narrow sense. This is especially true for long-range strategies.

(3) Invent new ways of modelling urban processes which are simple, transparent to the non-expert, and which give quick-and-dirty estimates of policy impact across many attributes (instead of spurious three-digit accuracy on a few); embed them in an open, freewheeling, but cumulating and learning, process of public participation in valuation. By the same token beware of systems analysts proposing large models; they are disturbingly and unrealistically rational.

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