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REGIONAL POLICY IN THE UNITED STATES*

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Implicit, Not Explicit, Effects Matter the Most

Rather than a complete survey of regional policy in the United States and the contrasts between it and policy in Canada, this paper will concentrate on a few major themes in the United States. The first theme one needs to stress is that the greatest effects of federal policies on regions in the United States are the *implicit* effects of federal tax and expenditure programs and other policies which are *not explicitly designed* to have regional effects. Those federal policies which *are* consciously designed to influence the regional distribution of economic activity have not been very significant relative to other federal policies. Furthermore, the explicit regional policies which have been instituted have usually been quite diluted in their impacts, due to Congress's insistence on spreading expenditures over many Congressional districts, or, what amounts to the same thing, its insistence on defining eligibility for assistance so loosely that a great many areas legitimately compete for a meagre budget.

But the effects of other federal policies on individual regions and on the regional structure of the nation are great. Those policies include the basic federal tax structure, the expenditure programs, macroeconomic stabilization policy, and the social security system, to name only a few. Let me throw out some illustrative examples.

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Federal Tax System

The United States tax system is somewhat progressive, so the higher income regions pay greater shares of federal taxes than their shares of population or income. That effect explains most of the so-called "deficit" which a typical Northeastern or Midwestern state has with the federal government: the residents of the state receive in federal expenditures less than they pay in taxes. While I would like to resist strenuously any implication that those "deficits" have the policy significance which many parochial observers attach to them, it is worth noting that the tax system is more important in causing them than the expenditure programs. Recent research by Janet Pack [7] has made that clear.[1] But the effects of the so-called "deficits", and no one denies that they are significant effects, are the natural consequences of a tax system which is designed not to accomplish regional objectives but to accomplish individual income distribution objectives in the nation as a whole. No one would claim that the tax structure has been designed to depress older, higher income regions, but of course it does have such effects - and appropriately so.

Before the 1978 revisions in the federal tax code, the investment tax credit feature of profits taxation was available for new investment but not for rehabilitation of existing structures. That policy must have had some biases in favour of regions which business regarded as good places for new investment, and biases against older, already heavily industrialized regions in the Northeast and Midwest, which had a preponderance of older capital stock which business might modernize with adequate incentives. The 1978 revisions fortunately eliminated the bias - fortunately for both the older regions and for national economic efficiency - and the 1981 revisions made the credit for rehabilitation of buildings even more favourable. The original bias was presumably not a conscious regional policy, although the later revisions to remove the bias were to some extent the result of strong lobbying by regions with older capital stock.

Another example is the very favourable tax provisions on fringe benefits in the form of employer and employee contributions to pension plans, which have effects similar to the national social security system which is discussed below.

Expenditure Programs

We are all familiar with the arguments that Federal expenditures favour, relative to population, the newer, faster growing areas in the South and West. That is broadly true for expenditures in aggregate, although of course not so for every major program. It has been true of defence expenditures for many years, for example, and many have concluded that the defence budget has been a major force in the regional restructuring of the nation. But the defence budget cannot be seen as an explicitly regional policy. We can debate the degree of regional bias and the degree of regional political influence in the major authorization and appropriations committees of Congress, but our conclusion would be that there is no conscious federal regional policy.

[1]Pack found that a hypothetical reallocation of federal expenditures on an equal per capita basis would reduce regional disparities in net flows of federal funds by only about 25 percent. That shows that the disparities in per capita taxes are more important than the per capita expenditures in determining the disparities in the difference between expenditures and taxes.

Macroeconomic Policy

The United States, like Canada, has been plagued by recessions in the post-World War II period. The widespread unemployment which results periodically is of course the result of a very complicated combination of external and internal forces, which policymakers find hard to control, and of the particular responses policymakers make in each cycle. Some recessions are the result of policy mistakes, such as too-abrupt restrictions on aggregate demand, or too-long tolerance of inflation which creates irresistible political pressure for abrupt restrictive policies. Recessions and extended periods of slack in the economy have very uneven effects geographically; they have relatively greater negative impact on the older industrialized core regions [3;5;8].

One reason for this is that the composition of demand changes in recessions, away from durable consumer goods and capital goods in which older regions specialize. Another reason may be the reduced ability of firms with older capital stock to compete in national markets when those markets are depressed.[2] If anti-inflation policy tilts more toward restrictive monetary policy than toward restrictive fiscal policy, which it often has done, that also has an effect on the composition of demand that adversely affects the older industrialized regions which specialize in the production of new capital goods.

Social Security Pension System

No one thinks of social security as a "regional policy". But one important effect of a national pension system is to make older people more mobile by giving them some financial independence of friends

[2]Age of capital stock and the resulting real production cost effects have been urged as explanations by various observers [1;3;11]. However, Marie Howland's [4] empirical test of the hypothesis that regions with older capital stock have more severe recessions produced inconclusive results. She found that for total manufacturing, the partial relationship between age of capital and severity of recession has been negative, counter to the hypothesis; however, for a single mature industry, textile manufacturing, the hypothesis is supported.

and relatives, and that has surely facilitated migration to regions with warmer climates and lower cost of living. In the United States those regions happen to be in the Southern and some Western regions, which are also growing rapidly for other reasons. The federal tax provisions favouring employer and employee contributions to private pensions have had similar effects. It is the *portability* of financial means, which pensions provide, that has implicit regional effects in a country with significant differences in climate and/or living costs across regions.

Those are a few examples. Rather than multiply or elaborate them, let me go on to a second major theme.

Long-Run Relative Decline of Older Core Regions

The long-run relative decline of the industrialized Northeast and Midwest is not something unexpected or surprising. One might not go so far as to say that it is *inevitable*, because one can imagine different international events and federal policies which would have delayed or reduced the relative decline. But many factors are at work to require the older regions to go through an extended transition and to force their residents to accept a process of adjustment to the decline. The geography of the country, the developments in technology and in world markets, the dynamics of economies of scale and external economies in the newer regions - with resulting import substitution in favour of locally produced goods and services and away from imports from the older regions - the reluctance of the federal government to intervene actively, all these have been at work.

The New England region began the transition first, and has perhaps even completed it - with mixed results. The Middle Atlantic region came under severe pressure in the 1970s and continues to be under pressure. The Midwest is suffering a genuine depression now in 1981-82. The Viet Nam War boom of the 1960s seems merely to have postponed the most visible signs of the process. The process of decline, greatly aggravated by the current recession, will force the regions' residents and their state and local public sectors to adjust to changing conditions.

The Adjustment Process

We can get a better sense of the transition and the required adjustments if we consider the options open to residents as they respond individually and collectively to the pressure on labour markets and on public sectors. The variety of options is my third theme.

Some people will leave the region, and perhaps quite quickly. The

quick movers probably emerge from the process with relatively little loss of real income: we can presume that quick exit is a sign that they do not value much the special market basket and non-pecuniary advantages of the region and have good opportunities elsewhere. It is possible that a quick mover really does suffer heavy losses and moves quickly in order to prevent them from being even greater. However, I suspect such people are less numerous, so the basic generalization is true. Quick movers do cause great losses for the residents who remain behind, because of the selective migration effect.

The people who stay for a longer time face downward pressures on real labour income, real income from local capital goods they own, and the net value of state and local government fiscal operations. There tends to be pressure to relax environmental standards; if the region collectively succumbs to the temptation it will suffer some real income loss in amenity and safety. Relative to the national average, money wage rates will fall; consumer prices (especially of housing and labour-intensive services) will fall, but not be enough to prevent real wages from falling. These processes, however, may be slow in getting under way and slow in proceeding.

To the extent that money wages are sticky, more of the adjustment will come about through unemployment or underemployment than if money wages are more flexible (relative to the nation). Finally, as we saw in many states and cities in the 1970s, some adjustment comes through reduced ambitions and expectations in the public sector, especially in the scope of its redistributive function. New York City is an example of a local government which for many decades had a strong enough position in the national and international markets for its good and services to be able to finance extensive redistribution through the public sector. In the 1970s its financial crisis showed that it had to reduce its ambitions.

The crucial question now is not whether the transition and the required adjustments will occur, but rather how fast the transition will occur and how severe the adjustments will be. Our past national experience shows that such adjustments are allowed to go on with relatively little federal assistance explicitly designed to delay the transition for regions as a whole. In recent decades, however, there have been extensive "people-oriented" programs of assistance to distressed individuals: unemployment insurance, welfare, medical care subsidies, food and housing subsidies, training and education subsidies. Those programs have, of course, had some implicit effect in slowing the transition by discouraging migration or allowing people to postpone migration, but that has been a price society has felt worth paying. Assistance to declining regions *qua* regions has not been very large relative to people-oriented policies, and I doubt it will become much larger in the future. An intermediate type of policy is represented by trade protection for specific industries and by agricultural supports. They are what we might call "industrial policies", which inevitably have concentrated effects on some regions, and the regional effects in these cases are fairly explicit. So they are exceptions to my generalization about the thrust of federal policy; I don't think they destroy the generalization. Trade protection, however, may well become more important in the future.

Given the traditional reluctance of the federal government to intervene aggressively, about all the politicians of the Northeast and Midwest can hope for is an avoidance of federal policies which unduly hasten the transition or aggravate the adjustment process. By this I mean policies which aggravate the transition without any clear offsetting gain for the nation as a whole. In general the fundamental technological and world market forces *cannot* be reversed even by an agency as large as the federal government, and clearly they *will* not be reversed or even heavily offset, in our economic and political system in which government intervention of the kind which would be required is not traditional and in which the sense of place or region has usually been subordinated to the goal of an integrated national economy.

I do not think the secular trends have played themselves out, but of course one can hardly be confident on this score. There seems to be a fairly elastic labour supply in the growing regions, so that rising wage costs are not rapidly eroding their competitive advantages.[3] Just how severe the adjustment problems will continue to be will depend on a number of things yet to be determined: Will there continue to be slack in the national economy? Will there be more sharp declines in the level of federal people-oriented policies which happen to benefit those population groups heavily represented in the older regions, particularly in their central cities? Will the society continue to allow state and local governments in the energy resource-rich regions to capture a significant part of the natural resource rents created in those regions, and thus enhance their position in the national marketplace for population and business investments?

Importance of Natural Resource Rents

The last question above suggests my fourth theme. Bill Alonso has often called the reemergence of Ricardian rent a central factor in regional economics and regional policy. He refers to the enormous rents on natural resources in the form of energy resources, in the regions such as the Southwest, Western Plains, Mountain areas,

[3]See the discussion by myself and others in Jackson *et al.* [5].

and Alaska. Many state, provincial, and local governments have already tapped these rents. While some Eastern and Midwestern coal producing areas offer counter examples (and, in Canada, perhaps Newfoundland's offshore deposits), they are not nearly as significant in the national pictures of both countries.

Governments in the energy-rich regions benefit by royalties, severance taxes, ordinary income taxes and profit taxes, and property taxes on the current output or the wealth under their surfaces. The structure of energy markets is such that some part of those taxes can be shifted forward on to consumers of energy in other regions. There is of course debate on just how much forward shifting will occur: Many observers argue that there will be considerable backward shifting as a result of reduced exploitation of the energy deposits. But what many have failed to see is that no matter whether there is forward or backward shifting, the burdens of the taxes are being passed on to residents of other regions. It is obvious that the other regions have a much larger percentage of energy consumption than they do of energy resources, but it is also true that the other regions' residents *own* a much larger share of the deposits and of the capital which is used in exploiting the deposits, *and* a larger share of the federal government, which is a major owner of the resources in question. As direct or indirect owners, the residents of other regions suffer from *backward* shifting as well as from forward shifting. The debate over the degrees of forward versus backward shifting, while important for income distribution reasons, should not blind us to the fact that one way or the other the state and local governments in the resource-rich regions are gaining at the expense of residents in the rest of the United States.

For the other regions, the immediate terms of trade effect and the taxation of the capital they own are bad enough. But in the longer run there is also a fear that the largess of the energy-rich regions will be sufficient to permit them to reduce taxes on individuals and non-energy business low enough to attract population and new business investment.

There is, by the way, a very interesting recent report from the Economic Council of Canada [2] which highlights the possibilities of rents as a force in migration. The authors of the report were convinced by their empirical research that the prospect of benefiting from the fiscal benefits of the natural resource rents has encouraged migration of persons from the rest of Canada to Alberta, Saskatchewan, and British Columbia. The attractiveness of the fiscal benefits is suggested by the fact that alone of the provinces Alberta has no sales tax, that it has the lowest personal income tax in the country, and that its tax-exempt Heritage Fund will finance future public services. The Economic Council report concludes that the prospect of sharing in the natural resource rents was a significant factor in encouraging migration, even after controlling for housing prices and employment opportunities, and especially so for low- and middle-income persons (but not for the very poor, who pay so little income tax they do not benefit from an unusually low rate and who are also deterred by high housing prices in the western regions of Canada).[4] These recent developments raise the possibility, in the United States, of adding an East-West political conflict to the continuing Frost Belt-Sun Belt one.

Merely to point to the appropriation of rents which is taking place is not to suggest a definitive answer to the normative question of how the rents *should* be distributed. Certainly national energy policies in both countries have already partially redistributed the rents away from the regions in which they are generated; that has been accomplished by federal ownership or federal taxes and by national price controls explicitly designed to reduce the impact of rising world prices on consumers in the two countries.[5] Nor does pointing to the rents which remain within the producing regions deny that those regions have some genuine grievances from the past, when *they* had to pay some of the taxes which other states and provinces levied on manufactured products and which were shifted forward on to consumers. It is also not to deny that the producing regions have legitimate rights to use some of the current rents to finance the preservation and restoration of the physical environment, which energy exploitation harms, and also to introduce some badly needed diversification into their economies. It is in the national interest to avoid excessive specialization in regional economies, for very undiversified regions will face serious adjustment problems in the future if the wheel of fortune turns again, this time against the resource-rich regions. As we can see from the present problems in industrialized regions, lack of diversification causes severe adjustment problems, which in turn create inequitable income distributions within regions and political pressures for trade protection and other national policies which reduce efficiency.

Even given all those points, however, I personally believe that the United States society ought to insist on a more equitable distribution of the natural resource rents across regions than it now tolerates, and which it appears ready to tolerate for some time, given the Congress's failure to act and the Supreme Court's decision in *Commonwealth Edison et al. v. Montana et al.* (1981).[6]

[4]There are of course many other effects of government policy on migration in Canada, including the deterring effect of recent liberalized unemployment insurance provisions and the federal equalization grants to provinces, which the Economic Council report finds reduce the net migration out of the depressed Atlantic provinces.

[5]This is well known to American readers; the Canadian results are discussed by the Economic Council of Canada in [2].

Policy Recommendations

I should continue on the theme introduced in the last paragraph and move on to normative considerations and specific policy recommendations. It is often said there are "problem regions". A nation with a lot of problem regions, as the United States is now, is of course a problem nation. In the end, however, there really are only problem individuals, and that is more important than the fact that they are clustered together in particular regions. They are persons who find their previous human capital and physical investments disappointingly unproductive, who find their capital very immobile in the sense that the costs of mobility are very high, who find their local public schools declining miserably in quality.

A nation with problem regions owes something to the individuals caught in distress in those regions. The most unfortunate aspect of policy in the United States today is not, in my judgement, the lack of explicit "regional policy", but rather the recent tendency to abandon individuals and the failure to provide adequately for local public schools, in which tomorrow's residents of other regions are being educated today.

There is some tendency now to renege on an implicit promise of earlier governments to insure individuals against losses caused by structural changes. Such insurance, provided it eases and encourages adjustment, is not only humane; it is also very useful in fostering efficiency in the long run, because providing insurance makes individuals more receptive to long-run structural change. In the absence of such "adjustment insurance", there are severe pressures on the federal government for inefficient place-oriented policies and for protectionist trade policies.

I have always found quite productive the simple distinction between "people-prosperity policies" and "place-prosperity policies", although of course the distinction is too simplistic for all purposes

[6]In that case, Commonwealth Edison and some other electrical utilities challenged Montana's 30 percent severance tax on coal, arguing that the tax is shifted forward and so amounts *de facto* to an export tax, which is unconstitutional. As McLure [6] pointed out, much of the argument in the case concerned the elasticity of demand for Montana coal, but in the end the Court decided that the tax was not an export tax - while most of it might be shifted forward on to consumers in other states, it was levied on all coal mined in the state, including the coal consumed there, and so was not a discriminatory export tax (". . . the tax burden is borne according to the amount of coal consumed and not according to any distinction between in-state and out-of-state consumers." Majority opinion, p. 8, quoted in [6].

and there is danger in overdoing it. But in general the proper place for place-prosperity policies is sharply limited, and we should continue to stress people-prosperity policies. They need to be designed to facilitate adjustment, including migration.

One problem with the American system is that migration out of declining regions seems to be too slow. I have in mind here that there are serious barriers to exiting from a high unemployment area, for poor and middle income groups in particular. In the United States there is not much in the way of centralized employment information and counselling services for lower income workers; most government labour placement services are, of course, operated by the states as part of unemployment insurance. There are capital market imperfections which impede lower income people from making the large investment necessary for migration. If you are a banker in Philadelphia, you will be rather reluctant to lend money to an unemployed sheet metal worker to allow her to move to Houston. You will worry about ever seeing her again, and your attitude would not change materialy *even if* the national economy were booming instead of being in a recession. An unemployed worker with very little taxable income will not benefit much from the tax deduction for moving expenses.

Now, it is interesting that higher income technical and managerial and professional people have fewer barriers. Their previous education and experience give them some advantage in finding new opportunities in other regions; their whole world view reduces their fear of moving; they more often have some nest eggs to tide them over the move; they get more tax savings from moving costs. Indeed, many such workers are subsidized by their present employers (national or multinational firms) in making the move; some firms automatically move people, if they are willing, from one region to another as part of the firms' own internal resource allocation process, and they continue to pay their employees' normal wages and subsidize the moving costs during the move. And this greater ease of movement *would* be made still greater if the national economy, including housing markets, improved. Thus there is a bias in favour of migration by educated higher income workers as compared to other workers. That seems to be a problem of efficiency as well as of equity.

On the other hand, many say that migration *into* some areas of the country is too rapid. Their argument is the familiar one that new migrants do not pay the full marginal cost of providing infrastructure and public services in the fast-growing areas. However, this is convincing only if one concentrates on a particular margin - the individual migrant, or perhaps the individual real estate developer building a new neighborhood. If one thinks of larger increments - very large neighborhoods, or five percent expansions in the size of a city over a few years - one suspects there is a much better chance that the new migrants do pay the marginal cost, or at least that their marginal willingness to pay covers the marginal social cost, which is what matters for aggregate efficiency. There may be some redistribution within the city which receives inmigrants, but on the whole one would think that the previous residents are fairly able to protect their real income position, in the political process, during expansion. Furthermore, I suspect that more municipalities are willing and able to insist on new residents bearing the marginal costs than were earlier in the postwar period (I have in mind recent developments in zoning and imposition of public service costs on developers).

There are imperfections in labour markets which cause excessive unemployment in declining areas - sticky wages. Perhaps they do contribute to *too much* migration out of the declining areas. However, sticky wages, first, become less and less sticky as time goes on (relative to the nation), and, second, are so ingrained in the American economic system anyway that they must be accepted as a *given* as far as regional policy is concerned. Practically speaking, the alternative to migration assistance is *not* more flexible wages, but rather unemployment - sheer waste of human capital. Migration, then, appears a reasonable second-best policy. Furthermore, as both American and Canadian observers have pointed out, relief to the unemployed inevitably deters migration somewhat, so the *net* effect of the sticky wage imperfection *plus* normal social policy to aid the unemployed is not necessarily *too much* migration. Thus, I believe that more assistance to migration is justified, after considering the whole array of imperfections in the system.

Place-prosperity policies do have some place, if they reduce individual distress and make the process of decline more orderly but at the same time offer incentives to migrate, or at least do not long delay outmigration. For example, federal assistance to local governments to maintain local infrastructure or crucial public services may be acceptable; federal subsidies for extensive *new* infrastructure, or for industrial development, are generally not.

One kind of place-prosperity policy for depressed regions clearly *is* appropriate. That is federal assistance to the local public schools in the desperately poor central cities in the declining regions. The reason is quite simple: sooner or later large numbers of the pupils are going to be living or working elsewhere in the nation, and then their poor education will show up as lack of productivity and other problems for the private and public sectors in the expanding regions. The same argument supports retraining and adult education. If such aid delays or deters migration for some people, as it will certainly do, that is a price worth paying.

The national government must resist strenuously the temptation to relax environmental standards in the declining regions.

While one might make an argument that in any one lagging region, the local preferences and the economic costs of rigorous anti-pollution policies would make some temporary relaxation efficient, the result would surely be a widespread relaxation and an example of the tyranny of small decisions. The most important rationale for national environmental policies in the first place is not that pollution from one source affects the entire nation, but that national standards are necessary to prevent competitive subsidization of industry.

As a general rule, people-orientation is still the best policy. Assistance to state and local governments should be limited to that adjustment assistance which is more efficiently channeled through them than directly to individuals. It is of course very hard to lay down precise rules in advance on just what is permissable under this criterion and what is not. The most important point I want to make is that the general spirit of federal policy should be adjustment assistance; once established, that spirit can certainly tolerate occasional errors and imprecision in impact.

Unfortunately, the outlook for efficient, targeted adjustment policies is not very favourable. Our basic political system is such that, once some limited adjustment assistance is agreed upon, there are irresistable temptations to spread it around too thinly and to dilute it beyond effectiveness. And it is hard to expect a Congressman to vote for aid to migration out of his district. Some targeting might be accomplished through trade protection for certain industries. But even that is not very effective targeting, and a more serious objection is that it introduces inefficiencies and delays the fundamental adjustments which are required.

Thus, I am rather pessimistic about the future of regional policy. I don't think much in the way of good policies will be forthcoming. There will continue to be temptations for inefficient measures such as trade protection of industries and subsidies for new industry in areas which already have excess capacity. We will probably not focus enough on the one kind of place-oriented policy which makes sense in our new situation, aid to public education in the poorest Northern and Midwestern cities. And, in the shorter run picture, it does not appear to me very *likely* - although surely it is *possible* - that we will be able to get our macro policy in order so that we avoid aggravating the adjustment problems.

References

1. Bolton, Roger. "Review of the Literature on Regional Econometric Models and Regional Business Cycles". Unpublished paper, Williams College, Williamstown, Mass. 1978.
2. Economic Council of Canada. *Financing Confederation, Today and Tomorrow.* Ottawa: Ministry of Supply and Services, 1982.

3. Friedenberg, Howard and Robert Bretzfelder. "Sensitivity of Regional and State Nonfarm Wages and Salaries to National Business Cycles, 1948-79", *Survey of Current Business*, 60:5 (May 1980), 17.
4. Howland, Marie. "Age of Capital and Business Cycles". Institute for Urban Studies, University of Maryland, College Park, April 1982.
5. Jackson, Greg, George Masnick, Roger Bolton, Susan Bartlett, and John Pitkin. *Regional Diversity: Growth in the United States, 1960-90.* Boston: Auburn House for the Joint Center for Urban Studies, 1981.
6. McLure, Charles. "Tax Exporting and the Commerce Clause: Reflections on *Commonwealth Edison*". Working Paper 746. Cambridge, Mass.: National Bureau of Economic Research, 1981.
7. Pack, Janet. "The States' Scramble for Federal Funds: Who Wins, Who Loses?" *Journal of Policy Analysis and Management*, 1:2 (1982), 175-95.
8. U.S. Advisory Commission on Intergovernmental Relations. *Regional Growth* (principal author: Janet Pack). Washington: U.S. Government Printing Office, 1980.
9. U.S. General Accounting Office. *Long-Term Economic Planning Needed in Oil- and Gas-Producing States.* Washington: The Office, December 10, 1981 (PAD-81-09).
10. U.S. Supreme Court. *Commonwealth Edison et al. v. Montana et al.*, 1981.
11. Variaya, Pravin, and Michael Wiseman. "The Age of Cities and the Movement of Manufacturing Employment, 1947-72". Working Paper 77-1, Institute of Business and Economic Research, University of California, Berkeley, 1977.