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Regions and Nations

This lecture is being given a few miles from Brussels, the headquarters of the European Commission. Let me be a little silly and describe the commission's mission as being to do at a practical level what I am trying to do at an intellectual level: to eliminate international economics (within Europe) and replace it with economic geography. If 1992 does what it is supposed to, then eventually the EC will constitute as integrated an economic area as the United States.

What difference will that make—and is it a good thing? More generally, where does the nation-state fit into the story of economic geography as I have been telling it? In the first lecture I suggested the usefulness of taking nations out of the story of interregional trade; now I have to try to put them back in.

In doing this, I want reverse the order of the previous lectures. In those lectures I started with economic geography at the grand level of regional development, of center versus periphery, largely because I had a cleaner model; only then did I turn

to the more modest issue of industry localization. Today I want to start more modestly, then move up to the big story.

Before I can do either, however, we need to spend a little time on the question of what a nation is, on how we should think about the role of political boundaries in economic geography.

What Is a Nation?

Let me start by emphasizing what a nation is *not*. A nation is not a region or a single location. That is, when we talk about the external economies that I have argued drive both localization and the emergence of core-periphery patterns, there is no reason to suppose that political boundaries define the relevant unit over which those external economies apply.

Suppose, for example, that I am interested in the economies of localization. These arise, I argued, from the standard Marshallian trinity of labor market pooling, supply of intermediate goods, and knowledge spillovers. All three of these probably typically arise at the level of a single city or small cluster of cities, an area small enough to make it possible for people to change jobs without changing houses, for hard-to-transport goods and services to be delivered; and for regular personal contact to take place. There is no reason to think that Vancouver and Montreal generate much in the way of joint localization economies—and certainly no reason to think that the spillovers between them are more important than those between Vancouver and Seattle.

Suppose, on the other hand, that I am interested in the grand agglomerative tendencies of the core-periphery model. Here the nature of the externality, I have argued, comes from market size effects in the face of transportation costs—from the forward and backward linkages that make producers want to concentrate near large markets—and puts large markets where producers concentrate. And here again there is no particular reason to think that national boundaries define a relevant region. To stay with my U.S.-Canadian example, surely Toronto is part of the core—indeed, industrial Ontario is generally considered by geographers to be part of a common American manufacturing belt—while Idaho is part of the periphery. The traditional European manufacturing belt sprawled across the boundaries of France, Belgium, Luxembourg, and Germany, but did not include the city in which this lecture is being given.

All this may seem pretty obvious, but economists still often get it wrong. Only a few years ago it was common for economic analyses of increasing returns and trade to assume that external economies applied at the level of a nation and to assert as their main result that big countries tend to export goods characterized by economies of scale. The result may still be hue—but it win be hue because national policies make it so, not because there is anything of inherent economic importance in drawing a line on the ground and calling the land on either side two different countries.

All of which leads us to the real reason why national boundaries matter and to the proper notion of a nation for our analysis. Nations matter—they exist in a modeling sense—because they have governments whose policies affect the

movements of goods and factors. In particular, national boundaries often act as barriers to trade and factor mobility. Every modern nation has restrictions on labor mobility. Many nations place restrictions on the movement of capital, or at least threaten to do so. And actual or potential limits on trade are pervasive, in spite of the best efforts of trade negotiators.

The force of these limits varies. In the era during which the U.S. manufacturing belt was emerging, European nations were delinking their economies through tariffs (and eventually war). Trade in manufactured goods among advanced countries is at this point fairly free, and in principle entirely free within the EC—though as we will see shortly, the extent of industry localization within the EC remains considerably less than within the United States. Labor mobility, by contrast, is far less today than in the era before World War I. Indeed, in the great era of European emigration, when migrants had to choose among Canada, Argentina, Australia, and the United States, we may suggest that at the margin effective labor mobility among these countries was nearly perfect.

But in any case the point is that countries should be defined by their restrictions. With that in mind, let us turn to the role of nations in industry localization.

Localization and Trade

Samuelsoh's Angel

If trade were completely free, the immobility of labor and even of capital among nation-states would not necessarily pose a

barrier to industry localization. Instead, each country would tend to develop its own set of localized industries, exporting the products of those industries it has, importing those it does not.

A useful way to think about this is via a fable. This fable was initially suggested by Paul Samuelson to explain the essence of the Heckscher-Ohlin model, but Elhanan Helpman and I have applied it extensively to trade in the presence of increasing returns.

Once upon a time, Samuelson supposed, there was an economy that was in equilibrium. (Strange how quickly the romance of the fable fades!) Capital and labor worked together freely, producing capital-intensive and labor-intensive goods alike. But the factors of production grew arrogant, daring to challenge heaven, and an angel descended and divided them into nations. Capital from one nation could henceforth work only with labor from that same nation—and the angel did not divide the capital and labor equally. What were the chastened factors of production to do?

The answer, of course, is that if the angel did not divide the factors of production too unequally, it would still be possible through trade to "reproduce the integrated economy." Nations that had a high ratio of capital to labor could concentrate on producing and exporting capital-intensive goods, trading them for labor-intensive goods from other nations, and achieve the same overall production and factor returns as before the angel's descent. Trade in goods would essentially be an indi-

rect way of achieving the now-forbidden trade in factors of production.

It is immediately obvious that this fable can be extended to encompass localization as well as comparative advantage. Suppose that before the angel's descent there were certain goods whose production was localized in particular industrial districts. After the angel's descent it may still be possible to achieve the same result: if no one district uses too much capital and labor, it will be possible for each industrial district to "fit" inside one of the new national economies, exporting its products while buying the products of other industrial districts in other countries.

Trade, in this extended fable, will arise from a mix of motives. It will represent both an indirect way to trade factors of production and a way to achieve the economies of localization. It will also ordinarily be beneficial to all concerned. Provided that the angel was not too malicious—carving up the world into countries too small to accommodate industrial districts or too unequally endowed with capital and labor to make up for their deficiencies through trade—everyone will achieve the same returns that she would have in the integrated economy. And trade will be beneficial both because of the gains from implicit trade in factors and because of the ability to realize the gains from localization.

This is a fairly pleasant story. How well does it correspond to what actually happens, and is its benign implication really right?

Europe versus America

Here as in the first lecture I have tried some first-pass quantification in an effort to get some empirical feel for the issues. Again the approach is crude but suggestive; because I now need to deal with international data, the results are even cinder. But they are, I think, interesting.

The starting point of this piece of work is the observation that the "great regions" of the United States—the Northeast (New England plus Middle Atlantic), the Midwest (East North Central and West North Central), the South, and the West—are comparable in population and economic size to the European Big Four. So one might expect that the degree of economic differentiation among U.S. regions and that among European nations might be roughly similar. In fact, one might expect localization to have proceeded further in Europe, if only because the distances involved in the United States are so much greater.

To make the comparison, one needs comparable data. This is a problem. The best I have been able to come up with is a set of employment statistics by (more or less) two-digit industries for European nations, which can be compared with regional employment statistics for (more or less) the same industries for U.S. regions. It's a crude comparison, but the best that I could do.

Using this data, I construct indices of regional/national divergence. These are constructed as follows. Let s_i be the share of industry i in total manufacturing employment in some re-

gion/country; and let a "star" indicate that we are referring to some other region/country. Then the index I use is

$$\sum_i \left| s_i - s_i^* \right|.$$

Suppose that two regions had identical industrial structures, that is, that industry shares of employment were the same for all *i*. Then the index would of course be zero. A little less obviously, if two regions had completely disjoint industry structures, the index would be 2 (because each share in each region would be counted in full). So the index is a rough way of quantifying differences in structures and hence regional specialization.

What I have done is to calculate this index for twelve pairs of regions/nations: for U.S. regions compared with one another, and for Europe's Big Four compared with one another. (I don't trust the comparability of the data enough to try the direct U.S.-Europe indices.) The results are shown in table 3.1.

The result does not come through as strongly as I would have liked, probably because the data are grossly overaggregated, but it is there: European nations are less specialized than U.S. regions. You might have the impression that the United States is a great homogeneous society in which regional differences have faded away, and culturally you would be right. But in terms of the economic roles they play, U.S. regions are more distinct than European nations.

A somewhat clearer picture emerges if I cheat a little and focus on what I think is the most revealing case. Compare the

Table 3.1
Indices of industrial specialization

A. U.S. regions, 1977	NE	MW	S	W
NE	-	224	247	.242
MW	-	-	.336	.182
S	-	-	-	.271
B. EC countries, 1985	FR	FRG	IT	UK
FR	-	.200	.197	.083
FRG	-	-	.175	.184
IT	-	-	-	.184

specializations of the Midwest and the South, on one hand, and of Germany and Italy, on the other. In both cases we are in effect comparing a traditional heavy industrial producer with a traditional light, labor-intensive producer. And as we see in table 3.2, which compares employment shares in selected sectors, the patterns of revealed comparative advantage in key industries are similar.

But the degree of specialization in accord with this revealed comparative advantage is very different. At one extreme, the Midwest has essentially no textile industry, compared with Germany's still substantial one. At the other, the South produces far less machinery than Italy.

Let me offer another illustrative comparison, this one of the automotive industry. Table 3.3 compares the regional distribution of the U.S. auto industry with the national distribution of the European industry. What it shows is that the U.S.

Table 3.2
Industrial specialization (share of manufacturing employment)

	Germany	Italy	Midwest	South
Textiles	3.7	9.1	0.3	11.7
Apparel	2.6	5.6	2.4	10.6
Machinery	15.8	12.9	15.0	7.1
Transportation equipment	13.2	10.4	12.8	5.9
Sum of share differences		35.2		62.6

Table 3.3
Distribution of auto production (percentages)

	U.S.	EC	
Midwest	66.3	Germany	38.5
South	25.4	France	31.1
West	5.1	Italy	17.6
Northeast	3.2	U.K.	12.9

industry is far more localized. In essence, the U.S. industry is a Midwestern phenomenon, with only a scattering of assembly plants in other parts of the country. The European equivalent would be a concentration of half the industry within 150 kilometers of Wolfsburg.

So although the data are spotty, the conclusion seems clear: localization has gone much further in America than in Europe.

Why? Obviously the reason is the existence of barriers to trade. I find it helpful to return to one of the localization stories from the last lecture, the one that focused on intermediate goods.

There I pointed out that there is a strong analogy between the core-periphery model and a simplified model in which each manufactured good within an industry is both a final and an intermediate good. In both cases concentration tends to take place when transportation costs fall and economies of scale increase. (The difference is that the share of manufacturing in demand in the core-periphery model corresponds, in the case of the intermediate goods model, to the share of output that is used as an input.)

Consider what happened during the nineteenth century: in both Europe and America, transportation costs fell and economies of scale grew more important. Thus the logic of localization grew stronger. But in Europe the fall of transport costs was opposed by tariffs, often rising ones. And of course for forty-five years after 1913, Europe was fragmented by exchange controls and, alas, worse things. Even since the formation of the EC, borders have remained significant nuisance barriers to trade, supplemented by differences in regulation and more subtle government policies that discriminate in favor of national products. The result is that European economic localization has remained far short of U.S. levels.

This comparison has a number of interesting implications for the future of the European economy, as it becomes more integrated. Let me focus on two: the potential adjustment problems and the issue of monetary union.

Suppose that eventually Europe will look like America, with a similar degree of localization and specialization. On the road

from here to there, this will have to mean a process of unraveling of at least some European industrial centers. If table 3.2 is any guide, Germany in an integrated European economy should be set to experience an unraveling of its textile and apparel industries and a relocation of those industries to Southern Europe, comparable to the relocation of traditional New England industries to the Southeastern United States in the early twentieth century. Offsetting this should be the rise of German industrial clusters in key heavy and high technology industries, while such industries in Southern Europe contract—which could be seen as a kind of Mezzogiornification of the South, even if it is in fact beneficial to both sides.

Now one can make a case that this process of specialization will, in manufacturing at least, be less dramatic than the U.S. comparison suggests. For one thing, there may be multiple equilibria that differ in the degree of localization as well as the specific choice of location. That is, if the United States had happened to develop two auto centers instead of one, it is possible that both would have survived; and the relatively dispersed European geography of manufacturing may survive better than a direct comparison with the United States would suggest. (I'll offer a clearer version of this argument when we come to center-periphery issues a little later.) Also, within the United States the trend over time has actually been toward delocalization of manufactures. Table 3.4 compares those indices of regional differentiation in 1947 and in 1985: there has been a definite decline. That is, the high-water mark of manufacturing localization in the United States was reached a long time ago, probably in the 1920s. If we think of Europe as

Table 3.4
Indices of U.S. regional specialization

A. 1947	MW	NE	S	W
MW	-	.361	.606	.441
NE	-	-	.560	.504
S	-	-	-	.403
B. 1985	MW	NE	S	W
MW	-	.224	.336	.182
NE	-	-	.247	.242
S	-	-	-	.271

converging to where the United States will be, not where it now is, the extent of adjustment required looks a lot smaller.

On the other hand, services are probably becoming more concentrated in the United States. If Europe were to follow suit, we would have virtually all sophisticated financial activity carried out in London; the whole entertainment industry in, say, Madrid; most sophisticated software designed near Oxford; all insurance companies headquartered in ... well, you get the idea.

The point, in any case, is that 1992 may not look like 1958. In the first great movement toward European economic integration, virtually all of the increase in trade took the form of "intra-industry" rather than "inter-industry" trade and brought relatively few problems of industrial adjustment. This time, as true U.S.-style industrial specialization takes hold, the transition may not be so easy to live through.

Going beyond the transition, what about monetary union? I have had nothing to say about money or exchange rates in these lectures so far, and I do not intend to say much here. The economic geography approach does, however, suggest that some commonly held conceptions need to be questioned. In particular, it has become near orthodoxy in Europe that 1992 paves the way for EMU—that closer economic integration makes the gains from monetary union greater, and the costs less.

This reasoning is based in part on the standard optimum currency area argument. We hypothesize that monetary union brings both benefits (reduced transaction costs in international trade, greater credibility and stability of monetary policy) and costs (greater difficulty in adjusting to country-specific shocks). The usual argument is that the greater the trade between two nations, the larger the gains from a common currency and the less the value of the freedom to adjust exchange rates. Because 1992 will lead to increased trade, it strengthens the case for a common currency.

So far so good. But it is also the case that the costs of a common currency are less the more similar two countries are in their output mix (and thus the less idiosyncratic the shocks they face). The general presumption among European analysts has been that 1992 will be accompanied by and indeed facilitate a continuing convergence of economic structure among EC nations, so that the case for a common currency derives yet a further impetus.

But if the evidence presented in the last few tables is right, European nations are likely to become less similar, not more, as a result of 1992—a d they will in this respect become less suitable as an optimum currency area as a result of increased integration. (A side implication, of course, is that the United States is arguably less suitable for a single currency than Europel)

I don't want to push this any further; let it stand as a surprise question raised by the geographical approach to international economics.

Center and Periphery, Again

We now turn from the specialization of economies to their size. I argued in lecture 1 that the interaction of increasing returns and transportation costs can explain uneven regional development at a grand level, with regions that have a head start in production attracting industry away from those with less favorable initial conditions.

This observation immediately raises a number of questions about competition among nations. Should small countries fear economic integration, lest their industry be pulled into the inevitably larger cores of their larger neighbors? Should countries pursue deliberate policies to ensure that they get their industrial cores? Does the core-periphery model explain uneven development at a national as well as a regional level?

Let's take a rough look at these questions.

Who Gets the Core?

At first sight, the two-region model developed in lecture 1 seems to have ominous implications for small countries. Shouldn't we think of two countries as two regions, with the larger country having the larger initial population—and thus, probably, attracting all industry away from the smaller nation?

Well, not necessarily—because countries are not identical to regions. To take the most spectacular recent example, we have suddenly become aware that the Soviet Union, although a huge economic unit, is a collection of regional economies; if, as seems to be happening, that economy breaks up into its geographical components, those components will individually bulk no larger than the nation's erstwhile Eastern European satellites.

So it may be more accurate to think of a large country as consisting of many regions, not big regions. And once we think of countries as collections of regions, we discover that it is by no means necessarily true that economic integration will favor regions in the larger country.

To see why, we need to be able to think about the core-periphery model in a multiregional framework, to get away from the two-region model. In the grand tradition of location theory, of course, we would go the whole way by abandoning the notion of regions altogether, imagining a continuous distribution of population across a two-dimensional plane. But that is much harder than anything I want to tackle right now. Let me instead assume a discrete set of regions, laid out in a

one-dimensional space; because I don't want to worry about end points, this space will have to be a circle. And I want to have as few regions as possible, consistent with telling some interesting stories; this turns out to be six. The resulting story is illustrated in figures 3.1 and 3.2: six regions laid out in a circle, with transportation possible only around the circle (impassable mountains in the middle).

As in lecture 1, imagine that there are two kinds of people: farmers, who are spread equally among the regions, and workers, who can choose where to live. Then one possibility is that the economy will form a single core; this is suggested in figure 3.1 by the shading of one region. Alternatively, if transport costs are high, economies of scale weak, and the share of "footloose" production small, manufacturing production may be spread evenly across the regions.

But there is another possibility, which is that the economy may support multiple cores. A particularly plausible example is

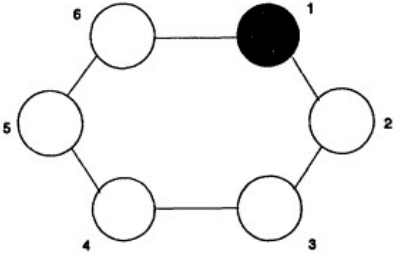

Figure 3.1

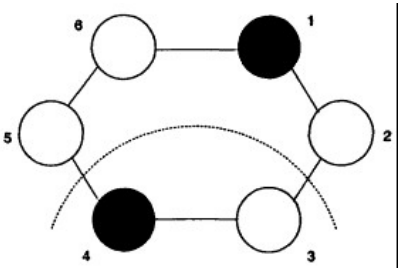

Figure 3.2

illustrated in figure 3.2, in which the shading indicates the formation of two cores at regions 1 and 4. Each core will have a "hinterland" consisting of the two neighboring regions.

Which of these pictures is right? The answer presumably depends on the same parameters that, as we saw in lecture 1, determine whether a core-periphery pattern emerges in the two-region case. If transport costs are low, economies of scale large, and the share of footloose industry in national income large, the result will be a single core; if the reverse is true, there may be no core at all; intermediate levels will support a multiple-core structure.[1]

Now consider the following hypothetical history: Initially the world illustrated in figures 3.1 and 3.2 consists of two separate countries, one of four regions, one of two; the boundary is

[1] As the analysis of lecture I also suggested, there may be more than one equilibrium structure—that is, both one-core and two-core geographies might be possible even for a given set of tastes and technology. Consider this point registered, then ignored, for the discussion that follows.

illustrated by the dotted line in figure 3.2. And we suppose that the two countries initially maintain sufficient barriers to trade and factor mobility that their economic geography evolves independently, with the large country developing a core in region 1 and the small country a smaller core in region 2. Then the two countries do a 1992, and merge into a single economic unit. What happens?

The answer depends on whether the ultimate equilibrium has one core or two. If the integrated economy ends up with only one core, then region 1, with its head start, will presumably attract all the manufacturing away from region 4. But if the integrated economy ends up with two cores, manufacturing in region 4 will actually expand at the expense of region 1, as it gains access to its full natural hinterland.

There is, I suppose, some presumption that the larger country will tend to gain manufacturing at the expense of the smaller when they integrate, because it is more likely to have large cores. But it is only a presumption, not a certainty—and the point is that one needs to think about the geographical structure of production, not treat countries as natural units of analysis.

Fighting for the Core?

We have seen that the two-region model, in which there can be only one core, can be misleading for international issues. Nonetheless, let us return to the two-region setup to ask a rather different question: does the geographical viewpoint have any implications for policy?

Now any model with mobile factors raises a basic question for policy analysis: on whose behalf should policy be made? Should Germany's social welfare function include *gastarbeiter* who happen to work there, but whose roots are in Turkey; should Turkey's include people who have moved to Germany?

Let me cheat and adopt a dearly inadequate concept: that of measuring the welfare of the immobile factors only. This amounts to taking into account only the "farmers" in our core-periphery model, while ignoring the "workers." For serious policy analysis it clearly won't do; but all I want to do is to make a point: that there may well be an incentive for countries to try to use trade protection and/or other policies to make sure that they get the core, or at least prevent their nascent core from being pulled away by neighbors.

It may be useful once again to present a suggestive picture (figure 3.3). In this picture I envision a two-region world of the kind described in lecture 1. What the picture shows is the welfare of the immobile "farmers" in each region as a function of the level of transport cost. When transport costs are high, there will not be a core-periphery pattern, so if the regions are of equal size, their farmers will have the same level of welfare. Lowering transport costs will raise welfare in each, to at least some extent, simply by increasing interregional trade.

If transport costs fall enough, however, we will reach the critical point at which the regions become differentiated into a manufacturing core and an agricultural periphery. And when that threshold is crossed, it is apparent that whereas immobile factors in the region that becomes the core will gain,

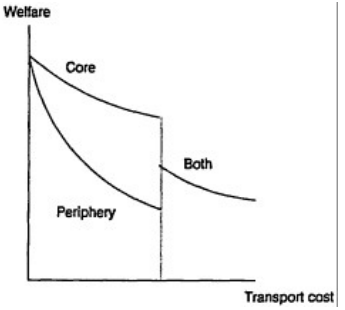

Figure 3.3

initially those in the other region will lose (because they will now have to import all their manufactures).

If transport costs were to fall still further, welfare would again rise in both regions. It would also converge: as transport costs go to zero, location ceases to matter, and both regions reach a common level of welfare that is higher than they would have had at high transport costs. This immediately suggests that for the region that becomes the periphery, there is a U-shaped relationship between economic integration and welfare: close integration is good, but a limited move toward integration may hurt, a point that I will return to shortly. For now, however, let me focus on what happens near the critical level of transport costs at which the regions become differentiated.

What is clear is that (1) the immobile factors in a region would prefer to be in the core rather than the periphery, and (2)

modest policy actions at the critical point can tip the balance in one region's favor. Imagine that it is 1860, and you perceive correctly that the invention of railroads is about to lead to the division of your continent into a manufacturing nation that contains a core and an agricultural nation that does not. Then you might very plausibly advocate a temporary tariff to ensure that you get the core. Once you have established a decisive lead in manufacturing, you can remove the tariff—and lecture the other country, which has effectively become your economic colony, on the virtues of free trade.

Has anything like this ever happened? Well, not exactly. But there is a story with some of the basic elements, and in which I think it is possible to make a pretty good defense of protectionism: the case of Canada before World War I.

Canadian Economic Nationalism

In 1873, when the various British colonies north of the United States were gathered under a single government, it looked likely that the whole nation would become part of the North American periphery to the already coalescing U.S. manufacturing belt.[2] We are used to thinking of Canada, like the United States, as being a great immigrant nation. In its early years as a nation, however, Canada attracted few immigrants from abroad—and Canadians, especially from impoverished Quebec, were migrating in substantial numbers to the United States. There was little manufacturing in Canada and seemingly little prospect that any would arise. Agricultural expan-

2. This section is based on Buckberg 1990.

sion was proceeding westward into the prairies, much as R was in the United States, but as in the United States it was not pulling manufacturing and urbanization west with it.

If one had made a guess in 1870, one would probably have predicted an agricultural Canada of perhaps 5 or at most 10 million people—a sort of oversized Nebraska. Most of those people would have been fairly prosperous, much as most U.S. farmers are; but there wouldn't have been much of a nation.

What happened instead, of course, was a deliberate policy of delinking from the U.S. economy. In 1878 Canada introduced the so-called National Policy, which had two main elements: a tariff wall that in effect forced the Canadian agricultural sector to turn to domestic producers rather than established U.S. suppliers, and a national railway that in effect subsidized East-West traffic in opposition to the natural North-South direction.

Isn't this simply a standard kind of infant-industry, import-substitution policy, of the kind that has gotten such a bad name in the past forty years? Not quite. Until the 1920s, Canada and the United States were in a fairly unusual situation with respect to one another: in effect labor mobility between the two was nearly perfect. The reason is that both countries were the targets of large-scale, economically motivated immigration, and so on the margin were competing for workers.

But what that means is that Canadian import substitution could do something that similar policies elsewhere cannot: by

protecting the domestic market, they could also enlarge it. Because Canadian farmers were forced to buy Canadian, there were more Canadians than there would otherwise have been and hence a larger Canadian market. In principle, that market would eventually be large enough to be self-sustaining. That is, the Canadian market would eventually become large enough to make it efficient to locate manufacturing there to serve the market even without protection. At that point the economy could throw away its crutches and accept free trade without fear of becoming peripheralized. This is not so much an infant-industry as an infant-country argument for protection.

Was this policy a success? Presumably that depends on one's objectives. What seems dear is that the policy did more than create a hothouse industrial sector that would die off as soon as it was exposed to the winds of international competition. Canada now is strong enough industrially to accept free trade with the United States without fearing that it will be peripheralized. (Well, okay, some Canadians still fear it, and they could even be right; but they are a minority and are probably wrong.) It seems reasonable to argue that Canada's nationalistic economic policies were the key factor in creating this strength.

Geography and the European Periphery

At the start of this lecture I suggested that the economics of Europe are in the process of ceasing to be international and becoming interregional instead. If this means increased local-

ization of industries, it will pose some problems of adjustment, presumably offset by increased efficiency. But what if it turns out that an integrated Europe gravitates toward a geography in which everything footloose dusters in the northwest corner of the continent, at the expense of outlying regions? Can the European idea survive?

Let me start with some facts about Europe at present, then ask what may happen in the future.

Center and Periphery in Europe Today

The population distribution of Europe does not at present exhibit anything like the unevenness of the American distribution. Within countries there are some core-periphery patterns: the continuing pull of greater London or of the Ile-de-France look familiar to Americans (and the landscape around these centers looks increasingly indistinguishable from my beloved, picturesque Northeastern Corridor). But in spite of considerable migration from South to North in the 1960s and early 1970s, there has been no wholesale concentration of population and employment in the areas of early industrialization. The reason is obvious: Europe has historically been far less integrated, both in terms of factor mobility and in terms of trade, than the United States.

On the other hand, Europe is characterized by a very strong center-periphery pattern when one considers not population but purchasing power. Interregional income differentials within Europe are much larger than within the United States,

and they are closely associated with geographical position. The European Commission has constructed an index of peripherality based on the distance of regions from markets and has classified regions according to this index; as table 3.5 shows, there is a remarkably strong gradient in income.

To a certain school of thought—say to Immanuel Wallerstein or Nicholas Kaldor—table 3.5 would look like a causal relationship running from peripherality to income. It is not hard to develop a variant of the core-periphery model that does not need factor mobility to function. Suppose that through forward and backward linkages, a region that has accumulated a lot of physical and human capital tends to have a higher, rather than a lower, rate of return on investment than a region where these factors are scarce. And suppose that the rate of capital accumulation itself depends on the rate of return. Then one can imagine an unequalizing spiral in which the world endogenously becomes differentiated into rich and poor nations. This story makes sense, especially given the kind of models that I have been examining; and it is indeed a story that I have written up elsewhere (Krugman 1981).

Table 3.3
Peripherality and per capita GNP in Europe

	(EC average = 100)
Central	122
Intermediate	105
Inner periphery	89
Outer periphery	64

Although there is surely some causation running from peripherality to low income in Europe, however, I would guess pretty strongly that the main causation runs the other way. That is, northwestern Europe is relatively rich for reasons that have to do more with culture than with geography.[3] And as a result, the richer regions are also relatively close to the large markets, which are themselves.

So I would guess that Europe's center-periphery pattern is not primarily the result of the kinds of forces that I have stressed in these lectures—though I am willing to be proved wrong. Nonetheless, that center-periphery pattern is there: that is, the poorer regions of Europe are in general also relatively distant from markets.[4]

What will happen to these regions as Europe become more closely integrated? The general presumption has been that with improved access of low-wage regions to the advanced European core, manufacturing will want to shift out to the periphery. This maybe how it will work out. But Tony Venables and I (Krugman and Venables 1990) have argued that this presumption isn't necessarily right: improved access might actually hurt, not help, peripheral industry.

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3. As Robert Solow once remarked, efforts to explain differences in national income levels and growth rates usually end in a "blaze of amateur sociology."

4. When I was a child, I distinctly remember seeing a set of "science facts" that included this rather Zen-like observation: "Although the moon is smaller than the Earth, it is also farther away."

Integration and Peripheral Industry

Imagine an industry that can locate in one or both of two places: a "central" nation in which the wage rate and hence production costs are high but which has good access to markets; or a "peripheral" nation in which labor costs are low but access to markets is less good. You might imagine that a reduction in transportation costs would always tend to shift production away from the center to the periphery; but you would be wrong.

The reason is that reducing transportation costs has two effects: it facilitates locating production where it is cheapest, but it also facilitates concentration of production in one location, so as to realize economies of scale. And when production is concentrated, it may pay to concentrate it at the location with higher costs but better access.

Table 3.6 offers a hypothetical example, initially suggested by Venables and myself. We imagine a good that can be produced in either or both of two locations: "Belgium," which we take to be a central nation, and "Spain," which we take to lie on the periphery. For simplicity, we imagine that total sales may be

Table 3.6
Hypothetical effects of lower trade barriers

		Shippins costs		
	Production costs	High	Medium	Low
Produce in Belgium	10	3	1.5	0
Produce in Spain	8	8	4	0
Produce in both	12	0	0	0

taken as given, that is, ignore any elasticity of demand and simply suppose that the location of production is chosen so as to minimize the sum of production and transportation costs. It is cheaper to produce the good in Spain than in Belgium, because Spanish wages are lower; but it is cheaper to produce the good in either location than in both, because of economies of scale. On the other hand, producing in both locations minimizes transport costs, while producing in central Belgium involves lower transport costs than producing on the periphery.

In table 3.6 we show three cases: high, intermediate, and low (in fact zero) transport costs. Not too surprisingly, if transport costs are high production will take place in both countries, whereas if they are low, it will take place in low-wage Spain: But a reduction of transport costs—in table 3.6, a 50 percent reduction in costs from the "high" case—actually causes the location of production to shift away from low-cost Spain to high-cost Belgium.

The reason is that in the medium transport cost case, costs are low enough to make it worthwhile to concentrate production, but still high enough that access to markets outweighs production cost as a determinant of location. So the relationship between transport costs and Spanish output in this industry is U-shaped rather than monotonic: over some range closer integration actually leads production to move perversely from the point of view of comparative cost.

Again, at a guess I would suppose that we are now on the good part of the U, not the bad: that railroads and steamships led to

deindustrialization of the periphery, but that 1992 will actually favor peripheral manufacturing. But we cannot be sure—and service industries, whose products are still difficult to transport, may recapitulate the history of manufactures.

Concluding Thoughts

There are costs to transactions across space; there are economies of scale in production. These two facts are the key to the story told in these lectures. Because of economies of scale, producers have an incentive to concentrate production of each good or service in a limited number of locations. Because of the costs of transacting across distance, the preferred locations for each individual producer are those where demand is large or supply of inputs is particularly convenient—which in general are the locations chosen by other producers. Thus concentrations of industry, once established, tend to be self-sustaining; this applies both to the localization of individual industries and to such grand agglomerations as the Boston-Washington corridor.

I explained this basic idea to a non-economist friend, who replied in some dismay, "Isn't that pretty obvious?" And of course it is. It was obvious to Alfred Marshall, to Allyn Young, to Gunnar Myrdal, to Albert Hirschman, to Allan Pred, and to Nicholas Kaldor. There is a sense in which these lectures are only a repetition of familiar ideas.

Yet while the ideas may be familiar, they have never become part of the mainstream of economic analysis. In the first lecture

I suggested that the main reason for this was the inability of economists to produce models of economic geography that satisfied the profession's ever-growing demand for rigor; and that this inability was in turn essentially tied to the problem of modeling market structure. In this sense these lectures are different from what came before: thanks to the efforts of industrial organization and trade theorists over the past twenty years, it is now possible to do geography as rigorously as you like. The geographers themselves probably won't like this: the economics profession's simultaneous love of rigor and contempt for realism will surely prove infuriating. I do not come here, however, to fight against the sociology of my profession, but to exploit it: by demonstrating that models of economic geography can be cute and fun, I hope to attract other people into tilling this nearly virgin soil.

The rewards will, I hope, be substantial. Regional comparisons offer a huge, almost untapped source of evidence about how our economy really works. In these lectures I have offered a few quick-and-dirty calculations based on casual use of readily available data; surely much more can be accomplished by someone with the patience for real empirical work.

Economic geography is also of considerable policy relevance. Regional issues are important in and of themselves; I have tried in this third lecture to suggest that a geographic perspective is also useful in offering an alternative approach to international economic issues.

Most important to my mind, however, is the support that the study of economic geography offers for a basic rethinking of

economics. In spite of a growing interest in 'path dependence," most economic analysis remains dominated by a style of model that I like to think of as TTFE: the idea that the economy's behavior is basically determined by its (exogenously given) tastes, technology, and factor endowments. In opposition to TTFE is what Paul David (1985) calls QWERTY (after the arbitrary layout of the typewriter keyboard): the idea that important aspects of an economy are contingent, determined by history and accident.

Many economists find QWERTY deeply disturbing and troubling. Like Paul David, Brian Arthur (1986, 1990), and others before them, I find it exciting and inspiring. But what I con-dude even from this preliminary study of economic geography is that it doesn't matter whether you find path dependence appealing or appalling. For at least insofar as the location of economic activity in space is concerned, the idea that an economy's form is largely shaped by historical contingency is not a metaphysical hypothesis; it is simply the obvious truth.