Geography, Agriculture, and Rural Development [1]

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Historically, human concentrations have followed agriculture, and, as formalized by von Thünen, agriculture concentrates around people. Improvements in productivity, transport, or optimal scale can dramatically alter those geographic relations, typically favoring urbanization and rural depopulation. In advanced economies like the USA, rural depopulation imposes higher costs on the remaining rural residents. In developing economies, rural depopulation imposes higher costs on pre-existing urban residents. Thus, rural development is a common concern, albeit for differing reasons.

Before we attempt to predict how subsidizing farming, transport infrastructure, agroindustry, or other public intervention could affect rural development, we should understand the effects of physical, technological, and market forces on the decisions of people and businesses to concentrate or disperse geographically. This presentation is a selective survey of the *theories* about the relationships between the places, industries, and people who are the concern of agricultural economists. We also survey the *evidence* about the past, present, developed, and developing economies. The main conclusions are that (i) while historically, people followed farms, and farms followed people, it is no longer true; (ii) good roads are not bad for rural development, (iii) the rural non-farm population does not appear to depend, in the long run, on the number of farmers; and, (iv) we can 'get rich by taking in our own washing' if overland transport is affordable and local credit markets function properly.

People followed farms, farms followed people

Agriculture has always been a critical determinant of human geography and community development. Population concentrations historically located in either the most inaccessible or accessible places. Inaccessible sites were chosen for the security they provided. Accessible sites were chosen for proximity to food- where the land, water, and climate most favored farming.

Mumford (1961) says that the "first germ" of a city is in the ceremonial meeting place. Fixed investments were also made in places that served as trading points or storage locations. Permanent settlements associated with agriculture appeared in the Mesolithic period, about fifteen thousand years ago. Animal husbandry also arose during that period. Mumford argues that:

> "the close quartering of men and animals must have had a stabilizing effect on agriculture: it turned the village environs, willy nilly, into a compost heap…the very act of settlement helped to make agriculture self-sustaining, except in the New World tropics where later, with more primitive methods of cultivation, using fire to clear the jungle, the village lacked stability, and ceremonial centers had no permanent population. But where human as well as animal dung was

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> fully used, as in China, even the growing city offset its own blotting out of valuable agricultural land by enriching the surrounding fields." (p 14)

In modern times, sites central to agricultural regions still attract concentrations of population, as transshipment, storage, and food and feed processing, and marketing activities optimally locate in the middle of the farm supply region (Kilkenny, 2003). In a state-level empirical analysis of the USA, Kim (1999) showed that food and kindred processing is materials-oriented.[2] The locational Gini coefficient for the food and kindred processing sector at the county level of observation is 0.15 (Barkley and Henry, 1998). This is significantly lower than the average for all sectors (0.3), indicating that agroindustry is one of the most widely dispersed in the USA. One explanation is that these establishments disperse to avoid competition for inputs (Sexton, 2000). Another is that the dispersion parallels the dispersion of the land resources used intensively in farming. But these dispersed agroindustrial sites are not 'rural.' Only 3% of U.S. agroindustry establishments are in rural counties, and there is disproportionately more agroindustry employment in urban than either metro or rural counties (Kilkenny and Schluter, 2001).

In modern as in Neolithic times, the establishment of an agro-industry (milling, storage, whatever) in the most accessible center of the growing region gives rise to a point mass of population there. The center's optimality is reinforced if it also becomes a transshipment point. And, the center remains an optimal site for agroindustry regardless of who is responsible for farm product transport; relative transport cost rates, or industrial input:output rates. The relatively dense place where off-farm activity locates becomes an urban concentration. Thus, because it locates to minimize the cost of obtaining inputs from a supply area, most agroindustry is urban even though it is materials-oriented. In sum, agriculture historically determined the locations of cities.

Agriculture also used to determine the sizes of cities. Hunting and gathering sustains less than ten people per square mile (Mumford, 1961). Aristotle thought that the ideal city should contain not more than 5,000 citizens (Rybczynski, 1995). Until the twentieth century, the extent of urbanization (the number and sizes of cities) was limited by the food surplus available to the people who lived in cities (Bairoch, 1988). Thus, until very recently, almost everyone lived in what are now called "rural communities."

Before the industrial revolution only about ten percent of a region's population could be sustained in cities, and even the largest cities were generally concentrations of fewer than 150,000 people (Bairoch, 1988; McEvedy, 1992). Rome reached a peak population of about one million inhabitants, but shrunk to 100,000 during the Middle Ages (Cipolla, 1994).

And, as summarized in Table 1, Asia was more urbanized than all other regions. That was due to Asia's agriculture. Rice can be harvested up to three times per year and provides more calories per hectare than wheat. Traditional Asian rice farm lands could support *five times* as many city people per farmed area as European or African wheat farms.[3] So Asian cities could be much larger.

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[2] An industry is classified as *materials oriented* when the cost per unit output of transporting inputs is higher than the cost of transporting the output, indicating that transport costs are minimized by siting the establishment at the input material's source location.

[3] Traditional rice: 2 crops per year·1600kg/ha·3600calories/kg = 11,520,000 ca/ha/yr; at 1000ca/cap = 11,520 non-farmers per rice-farmed hectare, ignoring storage losses. Traditional wheat: 1 crop/year·600kg/ha·3400 calories/kg = 2,040,000 ca/ha/yr = 2,040 non-farmers per wheat-farmed hectare, ignoring storage losses; Bairoch (1988).

Table 1. Percentage of Population Living in Urban Areas								
	1300	1500	1700	1800	1900	1950	1980	2000
World	9	9	10	9	16	26	37	47
Africa	4	5	4	4	6	12	25	37
America	8	8	11	12	29	48	64	76
Asia	11	12	11	9	9	15	26	37
Europe	10	10	11	10	30	43	64	74

Source: adapted from Bairoch, 1988, Table 31.1, p. 495. Data for the year 2000 by the population division of the United Nations, http://www.un.org/esa/population/publications/wup2001/WUP2001_CH1.pdf
Notes: A minimum of 5,000 is used as the criterion for an *urban* population. The urbanized share of the world's population is expected to reach 50% by the year 2007.

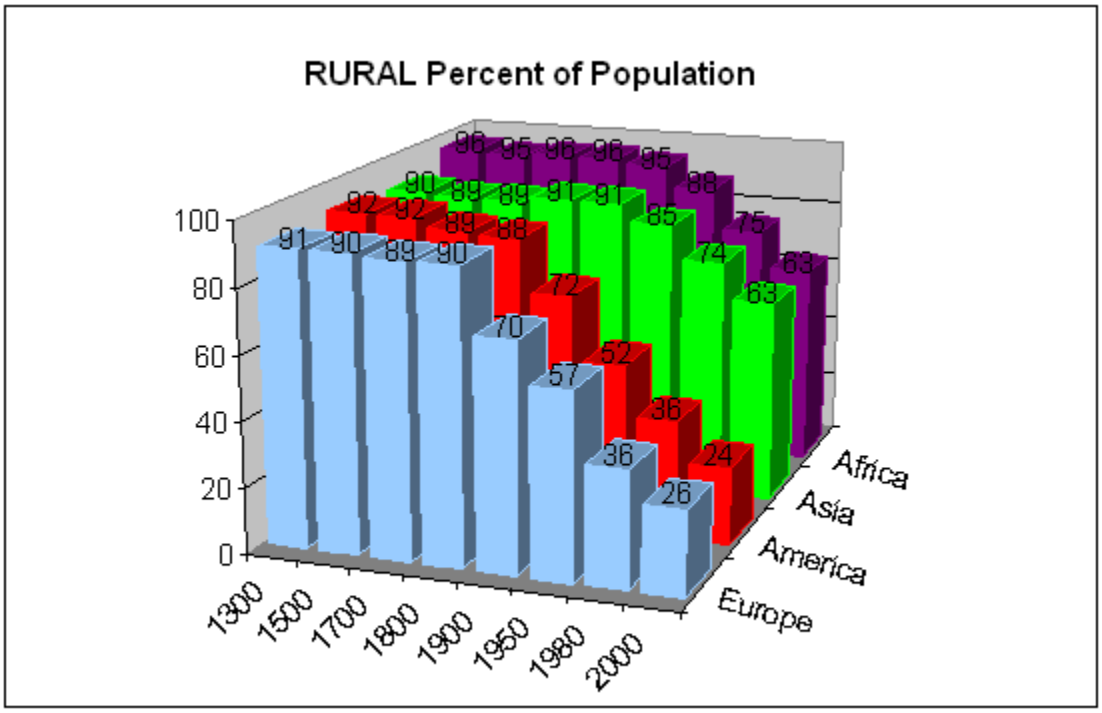


Table 1 (inverted to highlight the rural proportion of the populations)

Also until the industrial revolution, farms followed people. In 1824 Von Thunen wrote that when land is allocated to its most profitable uses, the activities that generate the highest revenues over production and transport costs (*bid rent*) will be found at each location. Von Thunen rationalized the observed geography of farm land use around towns: close-in intensive vegetable cropping and milk production, then extensive field crops and grains, and range lands farthest out. His insights explain urban as well as rural land use patterns today (Samuelson, 1983). In this way, cities have also determined the location of agriculture.

The extent of farming around a market (or city) is limited by the cost of transporting the land's produce. Let π denote the profits of an establishment in a market-oriented industry at distances (m) miles from the market:

$$\pi = P \cdot Q - c \cdot Q - t \cdot m \cdot Q - R(m) \qquad (1)$$

where P and Q denote output price and output quantity; c is production cost per unit (exclusive of the fixed cost of land rent); t is the output transport cost rate per unit per mile, and R(m) denotes land rent at location m. The extensive margin ($\underline{m}$) is the distance at which bid rents are exceeded by opportunity costs. If there are no alternative land uses, this is where rents are zero: $\underline{m} = (P-C)/t$.

Using the same basic analytical elements, we can easily show that where *transport costs to markets are high*, the payoff to production for market is low, so farm *productivity remains low*. Assume, for example, a "textbook" case where total costs (per farmer or per acre) include fixed costs and a cubic component (implying quadratic (U-shaped) marginal cost curves): $C = f + Q^3$. Then, profit = $(P - t \cdot d)Q - f - Q^3$, and the optimal output (per acre or farmer) is found from the first-order condition: $P - t \cdot d - 3Q^2 = 0$, to be $Q^* = [(P - t \bullet d)/3]^{1/2}$. Taking the derivative with respect to transport costs or distance (applying the chain rule) shows that optimal output per farmer or per acre is decreasing and strictly concave in t and d. In other words, farming for market is not rational too far from the city, where "too far" is determined by transport costs as well as distance.

This constraint continues to bind in developing countries today. For example, Omamo (1998) applied an agricultural household model with explicit transport costs to investigate the rationality of seemingly inefficient cropping choices. Households in a remote district of Kenya regularly devote larger shares of resources to low-yielding food crops than they do to cash crops that have higher market returns. He concluded that "improved rural road networks that reduce [transport] costs could abate motives to meet food needs through domestic production and promote specialization that raises farm incomes."

[photo of Zimbabwe cotton farmers and their crop budgets, transport incl; 1996 IAAE mtgs]

The implication of the transport cost constraint on the profitability of farming in developed countries is different. Where credit markets function properly, the transport cost rate (t) is clearly endogenous, through the shipper's choice of transport mode and scale. For example, in Iowa farmers own semis so they can ship large quantities of product across states.[4] McCann (2001) shows that under very general conditions the optimum size of the vehicle increases with the haulage distance and haulage weight. This means that transport cost rates decline with distance, and that profits are more likely to be strictly concave in distance between input and market locations, reinforcing and the *endpoint optimality* condition that rationalizes establishment clustering at input or market locations— never in-between (Hurter and Martinich, 1989; Kilkenny and Thisse, 1999).

A few more lessons from history about growth and development

Both farming and cities were transformed during the eighteenth and nineteenth centuries. A revolution in agricultural production preceded the industrial revolution (Cipolla, 1994). Farmers in Holland and Belgium (and England) developed intensive methods that dramatically increased

[4] The costs per ton per mile for hauling corn is 38¢ by wagon, 14¢ for single axle truck , and 7¢ cents per ton per mile by semi truck. (http://www.ctre.iastate.edu/Research/multimod/intranet/draft.html)

wheat yields per hectare. This allowed for the release of labor from farming, into other occupations, and supported the expansion of urbanization and industrialization.

Among the new machines were new modes of transportation. The shift from animal power and transport released acreage from the production of forage and feed for draft animals, so that all crop land could be devoted to food production. Dramatically increased food production per acre and dramatically reduced transport costs meant that much larger concentrations of people could be supported in cities very far away from farms. By 1850, London was the largest city in the world, until 1950, when it was outranked by New York, which was outranked in 1980 by Tokyo (Rybczynski, 1995). As made clear in equation (1), every innovation and invention that increased productivity (reduced the costs of production) or reduced transport cost rates, allowed the farming activities to be profitable farther and farther away from the city. Modern people no longer need to live near farms. And farms no longer have to be near people (see also Glaeser and Kolhase, 2004).

Electrification and the development of telecommunications and passenger elevators (in 1853 by Elisha Otis) supported an exponential rate of urban concentration.

> "Before the advent of the elevator, the height of buildings had been limited by human endurance in stair climbing. Urban buildings were four to six stories…but with the introduction of elevators, buildings could be made as tall as construction techniques and engineering would allow." (Rybczynski:118-9).

Through rapid, vertical construction, the population of Chicago grew 75 times in forty years from 20 thousand in 1850 to 1.5 million by 1890 (Rybczynski, 1995). (=11%/yr)

The increases in market size made possible by transport cost reductions also support 'Adam Smith' localization economies of scale: *the division of labor is limited by the extent of the market.* As the market expands, a preexisting plant can enjoy profits due to internal scale economies. That profitability entices new establishments in the same industry to open in the same location. As the number of plants rises, the local demand for inputs into the industry rises. At some point, the market for inputs becomes large enough to support plants that specialize in the inputs. This outsourcing allows both the upstream input supplying plants and downstream industry plants to profit from both the economies of scale and the productivity gains due to specialization. Thus, in larger markets, both costs and prices are lower. See Duranton (1998) for an excellent abstract model of this process of positive feedback and urbanization.

Indeed, measured labor productivity is higher in markets large enough to support multiple establishments in the same industry. The preoccupation in the current literature is to attribute this to the claim that urban workers are more productive than rural workers because of agglomeration economies and spillovers. A much more compelling argument (Syverson, 2003) is that while all workers and firms may be drawn from the same distribution of productivity, the competition in larger markets weeds out the higher-cost/lower productivity establishments. Thus, the observed distribution in cities is truncated from below, leading to higher average measured productivity in larger markets that can support many firms, than in small towns where there is only one.

Are bad roads good for rural development?

Since the 1890s, overland transport costs have fallen 90% (Glaeser and Kolhase, 2004). And just since the 1950s, water-borne transport rates for bulk products have decreased up to 70% due to improved maritime technology (Lundgren, 1996). Krantz (2000) argues that transportation

remains a major determinant of location because relative spending on transport (6-8% of GDP across OECD countries) has been relatively constant during the industrialisation and modernisation process. In contrast, Glaeser and Kolhase (2004) argue that transport costs for goods have fallen enough to be negligible. Their two positions are reconciled by noting that while transport cost rates have fallen, our use of transport cost services has increased, and the mix of modes of transport has changed substantially. In particular, in the USA we buy more things that require high cost truck transport (about 25¢ per ton-mile) and much less using cheap rail transport (3¢).

Water-borne transport has always been a hundred times cheaper than overland transport, and rail transport about ten times cheaper than truck. The improvements in transport technology and infrastructure over the past century have meant that the relative costs of moving things *within* countries has fallen more than the cost of moving things *between* countries. What this has meant for regional and rural development depends in part on how it has affected the size of markets and thus the scale of enterprise.

First, consider the effects of the technological changes in transport on world trade. Transport cost reductions do not seem to have been very important in accounting for growth in developed country trade. Baier and Bergstrand's (2001) empirical investigation of world trade among several OECD countries concludes that transport-cost declines explain only about 8% of the growth since World War II. Most of the growth in trade (67%) is explained by income growth, and the rest (25%) by tariff-rate reductions.

In developing countries, however, overland transport constraints still bind significantly. For example, Limao and Venables (2001) conclude that the relatively low level of African trade flows is largely due to poor road infrastructure, and confirm that an improvement in infrastructure from the 75th percentile to the median would lower transport costs by 12 percentage points and increase African trade volumes by 28 percent.

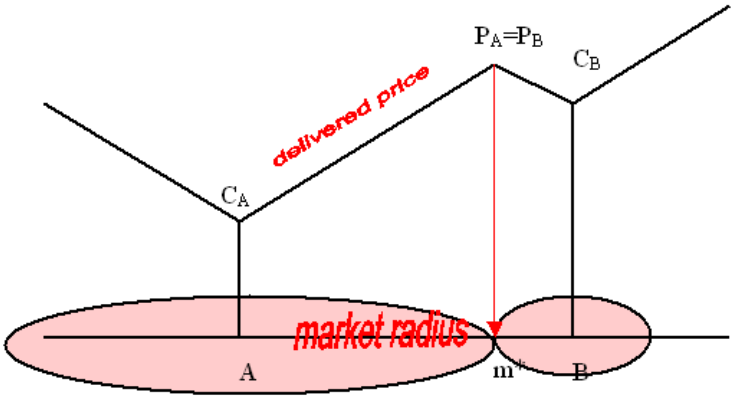
Second, consider *intra*regional trade. A region need not export to enjoy the benefits of returns to scale, specialization and trade if its domestic market is large enough. Frankel, Stein and Wei (1995) hypothesized that the increase in welfare stemming from *intra*-continental trade is larger the higher are the costs of international trade. World Bank economist Azita Amjadi with Alan Winters (1999) show empirically that intra-bloc transport costs impede the economic integration of the Americas, and that "reducing such costs could be an important complement to integration."

The point is that reductions in overland transport costs make continental markets more accessible, so that the benefits of trade can be captured just as well through *intra*regional specialization and *intra*regional trade. The economic history of the USA is one example of the efficacy of domestic market led growth. China offers another example. Shiue's (2002) study of eighteenth century China also shows that domestic market integration there was a significant source of economic growth. And we have already discussed the impact of transport cost reductions on the optimal intensity or productivity of farming.

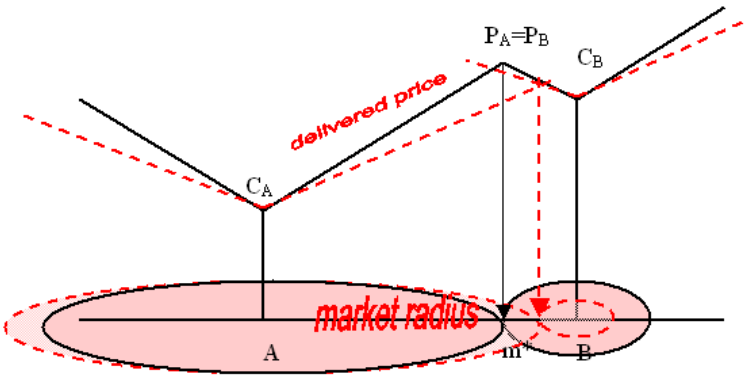
In developing economies, overland transport cost reductions can help expand the market size for domestic producers. Alternatively, in developed economies where market areas are already all-inclusive, reductions in transport costs cannot make all market areas larger. As all transport cost rates fall, larger producers or firms expand their market share at the expense of smaller ones. This is one of the many arguments that lead analysts to conclude that *intra*national transport cost reductions could actually work against rural development.

To demonstrate, consider two competing suppliers A and B. Assume that A is the lower cost/larger supplier. Formally: $c_B = (1+\beta)c_A$, $\beta>0$. Note that average cost (c) is endogenous; A may operate at lower cost simply because it enjoys internal economies of scale, but we will ignore that here to close the model.

Let the delivered price charged by A just cover unit costs plus transport: $P_A = c_A + t \cdot m_A$, where m_A is the distance to a customer from A; and the delivered price of B be $P_B = c_B + t \cdot m_B$. Furthermore, normalizing the distance between A & B = 1; $m_B = (1-m_A)$ so that each firm's market radii are the market shares on the interval AB (assuming customer density is constant for simplicity). Under these abstractions, $P_B = (1+\beta)c_A + t(1-m_A)$.



Supplier A's market radius (or market share) is the m* at which A's delivered price equates with B's: $m_A^* = [\beta \cdot c_A + t]/2t$. By the quotient rule, $\frac{dm_A^*}{dt} < 0$. As transport cost rates rise, A's market share declines. Conversely, as transport cost rates decline for all suppliers, the supplier with the larger initial market area will gain market area (market share) at the expense of the smaller supplier.



Another argument against transport cost reductions as a rural development strategy arises when some transport cost rates fall relative to others. In particular, using a general equilibrium model in the von Thünen tradition, Nerlove and Sadka (1991) show that as the cost of transporting agricultural goods falls relative to the cost of manufactures transport, it becomes economically feasible to cultivate land farther and farther from the city. The relative reduction in agricultural transport cost rates leads to (1) less farm labor per acre, (2) lower agricultural terms of trade, (3) a

lower and more dispersed rural population, and (4) an increased proportion of the labor force that works in cities. In other words, according to their hypotheses, good roads are bad for rural development. Nerlove and Sadka's model, however, does not allow for the endogenous location of non-farm activity. Thus, it cannot be used to explain why there are any non-farm households outside the city, and it is not a model that should be used to analyze rural development in general.

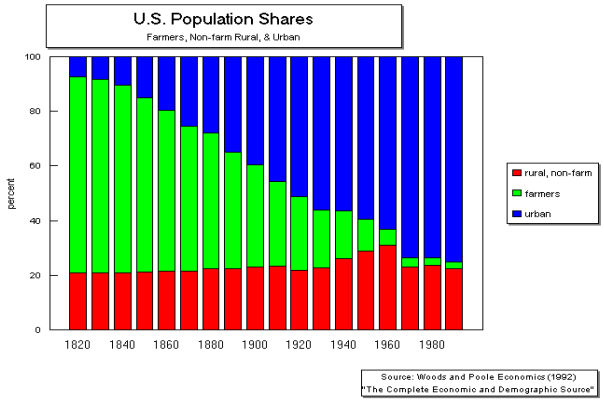
By the same token, Hu (2002) published a spatial agglomeration model designed to explain the increasing regional disparity within China. Given the coast's geographic advantage in international trade, it is the initial location for industrial agglomeration. The predominance coastal cities is reinforced by the positive feedback of external increasing returns to scale. The location disadvantage of the interior is due to their higher transportation cost on international trade. Hu writes, "the model suggests that increasing domestic accessibility can actually make the interior worse off." This pessimistic conclusion may be the consequence of the (dubiously appropriate) assumption that all of China is already within some firm's market area, in which case transport improvements help the big get bigger. But if in fact there are inaccessible places, improving their accessibility will be beneficial.

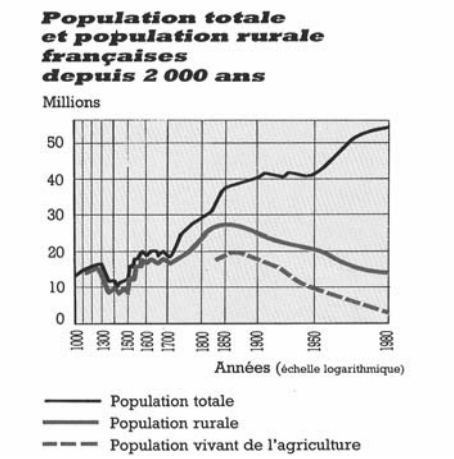
The most famous demonstrations of transport cost reductions leading to rural depopulation are arguably contained in the recent *new economic geography* book by Fujita, Krugman, and Venables (1999); see also Neary (2001). Drawing on the journal articles they published during the 90s, Krugman, *et al*. model urbanization relative to 'agriculture' by formalizing the trade-off between increasing returns and the costs of serving a dispersed market of 'farmers' tied to their land. They pose different models by choosing among four sets of assumptions (i) space is discrete (two regions), continuous and bounded (racetrack), or continuous and unbounded (von Thunen-style); (ii) labor is sectorally and/or regionally mobile and/or immobile; (iii) land and rent are ignored or explicit, and (iv) goods and industries are homogeneous or differentiated, final or intermediate, and free or costly to transport.

All their models are closed using a Dixit-Stiglitz formalization of inframarginal monopolistic competition and 'ad hoc dynamics.' Regardless of which set of assumptions they use, all their two-region models with mobile factors generate just two types of stable spatial equilibria. The (non-farm) economic activity subject to increasing returns is *either symmetrically dispersed* or *fully concentrated in one of the regions*. As the authors say, they want to explain agglomeration. They are careful to never say anything about rural development or policy.

And that is good, because while the empirical evidence is consistent with the implications of the von Thunen model (by Nerlove and Sadka, 1991); it is not consistent with the implications of most new economic geography models.

Over the past two hundred years, while the share of the U.S. population that are *farmers* has fallen from 70% to 2%, and the share that is *rural* has fallen from 90% to 24%, the share of the population that is rural, but not farmers, has stayed remarkably stable at about 20%. Similarly, in France, although the number of farmers has fallen dramatically, France's non-farm rural population has remained around eight million since 1850 (Ravignan and Roux, 1990).





This stylized fact poses quite a puzzle. It also has very interesting implications. It contradicts Krugman-style new economic geography models which find no economic rationale for the existence of any non-farm, remote, low density populations. And it contradicts the claim that agriculture is the long-run *economic base* of rural communities. The fact the shares or levels of non-farm rural populations have not fallen with the farm population indicates that the rural non-farm population of a region does not appear to depend, in the long run, on the number of farmers. Contrary to the assumptions underlying most new economic geography models, an "immobile farm population" is not the main dispersive force in developed economies.

A few new economic geographers, however, have succeeded in rationalizing the stability of co-existing small and large concentrations of population and diverse economic activity in one competitive economy (Nakajima, 1995; Calmette and Le Pottier, 1995; Kilkenny, 1998; Helpman, 1998; Klaesson, 2001; Lanaspa and Sanz, 2001; Daniel and Kilkenny, 2002). To do so they formalized other dispersive forces.

Kilkenny (1998) for example, assumes that competition for workers and customers is localized rather than *inframarginality* (that local wages and market prices are unaffected by the entrance of a new business). Second, she formalizes the decision to invest in a locality according to latent or potential demand for local varieties rather than current expenditures, which are zero on things not yet produced there. Third, people choose locations to maximize real rather than nominal income; where the *real* income of a rural resident is higher than that of a city resident who earns the same nominal wage, if rural rents are lower.

Fourth, where agglomeration economies lower costs, rents are higher. This is also obvious from Equation (1). A reduction in average production costs, due to rising agglomeration economies of scale, for example, would raise the rents that could be extracted in the city, as well as extend the margin of urban land use. Thus, cost-savings due to agglomeration economies in cities are offset by higher urban land rents. Kilkenny's models show that although transport cost reductions initially support concentration, they ultimately support the expansion of the non-farm rural population.

We <u>can</u> 'get rich by taking in our own washing'

The last point is that if overland transport is affordable and local credit markets function properly, rural communities do not need to depend on export agriculture. They can develop by providing and trading goods and services among themselves.

We have already argued that the gains from specialization and trade can be achieved by trading within regions. We have also already argued that overland transport cost reductions relax the market size constraints against expansion of farm and non-farm establishments to efficient scale. The importance of local financial intermediaries who accept local deposits and make local loans (thereby multiplying money *locally*), however, is too large a topic to elaborate in this paper. Suffice it to say that rural credit markets must function properly or there will be no sustainable rural economic development. For example, in his survey of European regional development policies, Hart (1993) concludes that "neither inter-regional nor intra-regional transport investment will promote sustained growth in disadvantaged regions if other favorable conditions are lacking," and, "a skewing of transport investment toward disadvantaged regions may improve their relative economic position if well integrated with other policies, such as an increasing role for …private sector finance."

Now let's scrutinize the notion that rural development depends on net exports. The idea that a region must export to grow is known as 'export base theory.' No one defines or challenges that theory more eloquently than Hoover and Giarratani (1984). In their words:

> "some activities in a region are peculiarly *basic* in the sense that their growth *leads and determines* the region's overall development; while other *(non basic)* activities are simply *consequences* of the region's overall development….The usual economic base theory identifies basic activities as those that bring in money from the outside world, generally by producing goods or services for export. …retail trade, utilities, local government, and services may be classed *en bloc* as non-export, while [commercial farming and] manufacturing is considered wholly an export activity."
>
> "The view of export demand as the prime mover in regional growth raises some interesting questions … if all the regions grow, then the whole country or "superregion" must also be growing, despite the fact that it does not export at all. The world economy has been growing for a long time, though our exports to outer space have just begun and we have yet to locate a paying customer for them. It appears, then, that *internal* trade and demand can generate regional growth: A region really can get richer by taking in its own washing."
>
> "…if a region can develop local production to meet a demand previously satisfied by imports, this "import substitution" would have precisely the same impact on the regional economy as an equivalent increase in exports. In either case, there is an increase in sales by producers within the region. It is quite incorrect, then, to identify a region's *export* activities exclusively as the basic sector."
>
> "A more fundamental flaw… is the implication that a region will grow faster if it can manage to import less, and that growth promotion efforts should be directed toward…excess of exports over imports."

> "If a region's earnings from exports exceed its outlays for imports, on net there is an exodus of productive resources from the region (as embodied in goods and services traded). In this sense the region is loaning its resources to other areas, … the region is a net investor, or exporter of capital. By the same token, if imports exceed exports, the region is receiving a net inflow of capital from outside. It is patently absurd to argue that the way to make a region grow is to invest the region's savings somewhere else, and that an influx of investment from outside is inimical to growth. If anything, it would seem more plausible to infer that a region's growth is enhanced if its capital stock is augmented by investment from outside—which means that the region's *imports should exceed its exports.***"** (Hoover and Giarratani, 1984; http://www.rri.wvu.edu/WebBook/Giarratani/chaptereleven.htm)

Empirical evidence that higher farm export earnings, and farm subsidies in particular, have not been conducive to rural economic development in the USA has been provided most recently by Goetz and Debertin (1996).

Finally- Jane Jacob's wisdom (tba).

Summary

To help predict how subsidizing agriculture, agroindustry, or transport infrastructure, for example, could affect rural development, we have surveyed theories about the relationships between rural places, rural industries (including agriculture), and people. We focused mainly on theories that have not been rejected by the evidence from the past, present, developed, or developing economies. We also criticized some widely-held notions and recently popular theories (export base theory, the new economic geography). Our main conclusions are that although people historically followed farms and farms followed people, that is no longer true; but that is OK because the rural non-farm population does not appear to depend, in the long run, on the number of farmers. Good roads are not bad for rural development. And, we can 'get rich by taking in our own washing' if overland transport is affordable and local credit markets function properly.

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