ANSWERS TO STUDY QUESTIONS

Chapter 3

3.1. The rank/size rule is expressed as follows: City Population = Largest City's Population/ Rank of City. In other words, if you rank all the cities in a system of cities such that the most populous city has a rank 1, then the population of each city will approximately equal the largest city's population divided by the rank of the city. The rule implies an exponentially declining pattern in city size.

3.3. Zipf's law assumes that all cities will tend to have the same volatility of growth, which may be true for cities that are large enough to have a diversified economic base and this diversification can reduce volatility to a common level. However, smaller cities may lack sufficient diversification in their economic bases and may therefore have greater volatility in their growth. If there is a minimum critical mass for city size, below which a city will tend to wither and die away, then the volatility in smaller cities' growth will cause many of them to sink below the critical size at some point. This will result in fewer small cities than there should be according to Zipf's law.

3.5. *Economies of scale* refers to the phenomenon whereby it is cheaper and more efficient to produce more of a good or service in larger volume at fewer sites. This is caused by fixed production costs at a given site. *Economies of agglomeration* are cost or productivity advantages to the clustering of firms or work sites physically near each other. These may result from "vertical linkages" in the production process or from "horizontal linkages" across firms such as the sharing of a common pool of skilled workers or existence of a critical mass of experts in a given field.

3.7. There is a locational advantage to the cluster where auto malls are located. This is typically near a center of population, where demographic and economic growth is taking place because that will ensure sufficient demand for cars in the area. Furthermore, cars are imperfect substitutes for each other and customers typically need to comparison shop. Thus, a dealership trades off greater local competition for comparison-shopping externality (i.e., customers visiting nearby dealership are also likely to show up to compare goods). Similar logic can be applied to explain why shopping malls are not clustered. First, there needs to be sufficient growth and population to support a second mall. Second, unlike cars, goods and services available at one mall would be almost perfect substitutes for each other. In such cases, customers would just go to where prices are the cheapest, effectively cutting out the need for two malls.

3.9. Central place theory and hierarchy theory would suggest that it would be difficult to develop successfully a second shopping mall near an already successful mall unless the market has grown sufficiently to support a second mall and/or the second mall differentiates itself sufficiently from the first.

3.11. The aircraft engine factory and the hotel serving out-of-town convention business are clearly part of the basic (export) sector of the local economy. The revenue obtained from these businesses comes primarily from sources outside of the local area. A grocery store is clearly not part of the basic sector, as it serves primarily only a local clientele. The motel serving traveling salespeople is probably also best classified as part of the nonbasic sector. Although its guests come from out of town, they are not part of a local production process that sells to out-of-town customers. Rather, the opposite is true; they are selling to the locals. (They are part of the import sector rather than the export sector.)

3.13. $N = N_E + N_S$, with $N_S = kN$. Substitute out for service (or nonbasic) employment in the employment expression to obtain $N = N_E + kN$. Collect terms to find $N(1-k)+ = N_E$, which, in terms of changes, takes the form, $\Delta N = [\frac{1}{1-k}]\Delta N_E$.

The term in square brackets is the *employment multiplier*. Since k is a constant greater than zero but less than one, the multiplier is greater than 1. Therefore, a change in export employment results in a larger change in total employment.

3.15. If any of the three alternatives makes up the economic base or the export sector of the local economy, then that sector will create the most jobs. This is because an expansion in the economic base has a multiplier effect on the total employment of the region due to dependence on that sector. If none of the three alternatives make up the economic base, then the sector with the highest location quotient will be the most likely one to create the most number of new jobs.