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Featured graphic. City networks in the United States: a comparison of four models

The study of intercity networks could help generate a better understanding of our increasingly interconnected global community. We studied connections between sixty-one major cities in the United States for the year 2010 and employed four major measures of intercity flows: (1) extraurban connections [figure 1(a)] estimated by a classic gravity model based on the product of pairwise cities' populations and squared geographic proximity (ie, with a distance friction factor of 2); (2) Internet connectivity [figure 1(b)] between cities measured by the DIMES Internet mapper project (Shavitt and Shir, 2005); (3) recorded business air-travel flows (Neal, 2010) among selected cities [figure 1(c)]; and (4) intercity connectivity (Taylor, 2011) inferred based on locational strategies of leading advance producer service firms [figure 1(d)]. Two of these networks are observed flows: airline and Internet, whereas the other two are estimated propensity to interact (Derudder and Witlox, 2008). The color density and width of lines are proportional to the standardized connection strength (standardized connections more than 10% of the maximum connection were plotted), and we also mapped the ten most central cities in terms of network degree in individual networks. Chicago, Los Angeles, New York, San Francisco, and Washington ranked consistently high in four networks. Network patterns in business air-travel and producer service firms are highly correlated (Pearson correlation coefficient = 0.82) as they both reflect the economic dimension of the intercity network. Internet connectivity, airline network, and firm network have more long-range connections than those being inferred by a gravity model, the only model where San Francisco and Los Angeles enjoy stronger connections with each other than each with New York. Other networks that can be incorporated into this framework include population migration network, leisure air-travel network, modified gravity models (Neal, 2010), and cargo transport network.

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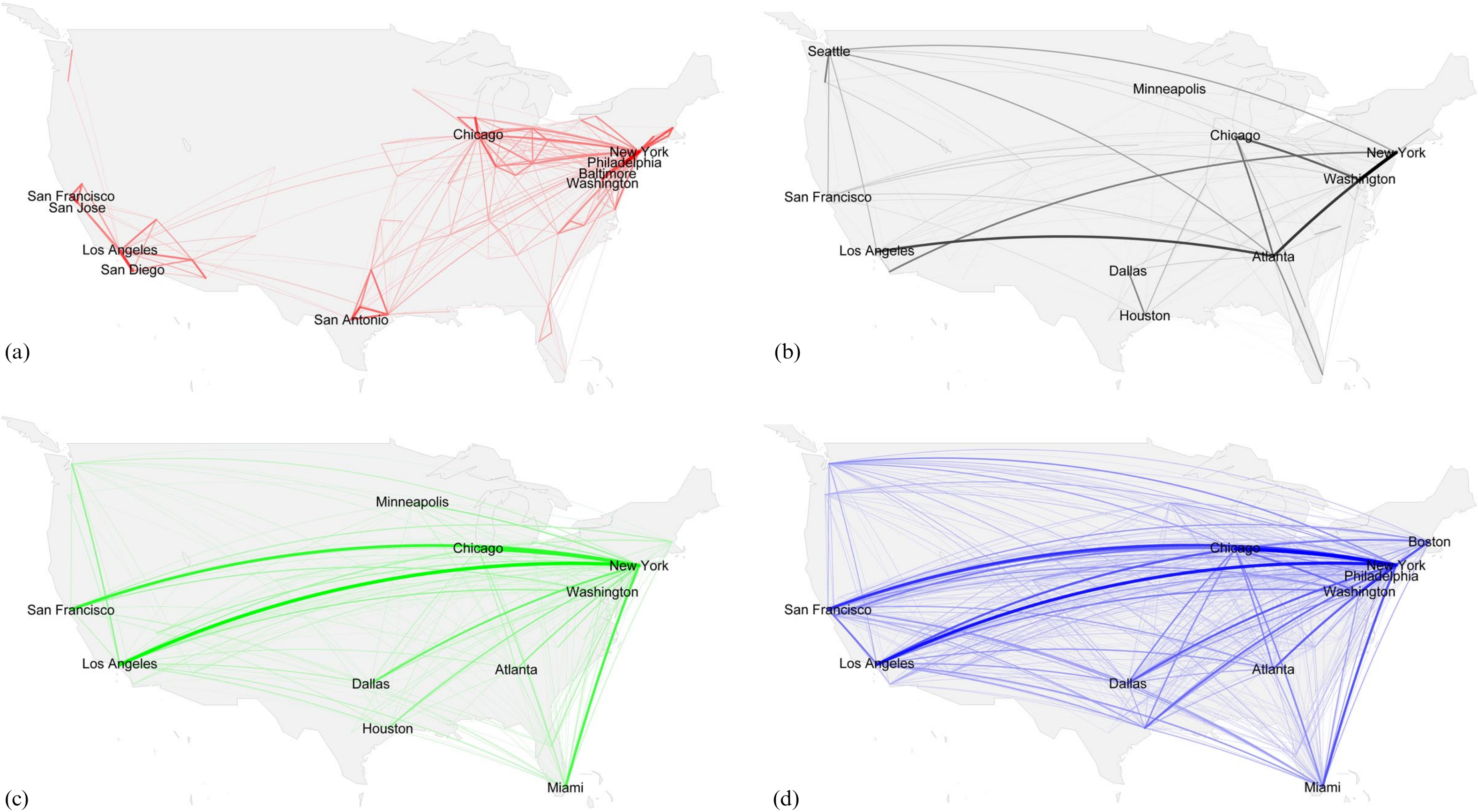

Figure 1. In color online