



US cities and productivity in the railroad era

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The Great Depression is considered one of the darkest times for the US economy, but some argue that the US economy experienced strong productivity growth over the period. This column reassesses this performance using improved measures of total factor productivity that allow for comparisons of productivity growth in the Depression era and in later decades. Contrary to Alvin Hansen's gloomy prognosis of secular stagnation, the US economy was in a very strong position during the 1930s by today's standards.

Benefits of agglomeration

There is increasing recognition in European countries that successful cities are important in raising productivity and competing successfully in a globalised world. In this context, a major report recently explored the portfolio of cities that the Netherlands should seek to develop over the next few decades in terms of the optimal degree of diversification or specialisation of economic activity (CPB 2010). Similarly, in the UK, there is intense interest in the possibility of creating a 'northern powerhouse' to exploit productivity benefits from agglomeration.

This newfound emphasis on cities is underpinned by academic research in the new economic geography tradition which has provided increasingly solid evidence that cities offer externalities that raise labour productivity (Combes and Gobillon 2014). The sources of agglomeration externalities can be categorised as sharing, matching, and learning mechanisms. Sharing mechanisms include sharing indivisible facilities, the gains from a wider variety of input suppliers and from a finer division of labour, or sharing risks. Matching mechanisms include better expected quality and/or higher probability of matches especially between employers and workers in a larger labour market. Learning mechanisms relate to the diffusion and accumulation of knowledge including tacit knowledge which is enhanced by the proximity of other producers. Benefits of agglomeration that occur within industries are fostered by specialisation within cities while those which are inter-sectoral accrue from industrial diversity. Conventionally, the former are described as Marshallian (Marshall 1890) and the latter are termed Jacobian (Jacobs 1969). An important issue for policymakers is whether specialisation or diversity is more conducive to agglomeration externalities. The evidence for the present day gives support to the existence of both Marshallian and Jacobian externalities but suggests that the former predominate (Harris and Moffat 2012). In turn, the ability to exploit these gains from specialisation depends on transport systems that facilitate trade between cities at home or abroad.

Agglomeration externalities in US cities, early 20th century

Our recent research (Klein and Crafts 2015) explores agglomeration externalities in manufacturing in cities in the US around the turn of the 20th century, about which there has been little quantitative evidence hitherto. This is an important period when the US took over industrial leadership from the UK during the so-called '2nd Industrial Revolution'. It was also the point at which

the development of low-cost transport of freight led to a much better integration of the internal market and inaugurated the era of mass distribution and mass production (Chandler 1977).

We examine the relationship between labour productivity growth in US cities at the sector level and the industrial structure of the city.

- We show that there is a strong causal effect of greater industrial specialisation on productivity growth, but that increased diversity reduced productivity growth except in very large cities.

This is consistent with the increasing body of evidence in the new economic geography literature that Marshallian externalities are important. During the decades at the end of the 19th and beginning of the 20th centuries, specialisation in US cities increased considerably, underpinned by improved inter-city transport (Pred 1966).

Our measure of specialisation shows an average increase of 24.9% across our sample of cities (see Table 1). For example, between 1890 and 1920, the specialisation index of Chicago increased by 10%, that of Baltimore by 25%, and that of Akron, Ohio by 36%. Using our preferred regression, this implies that labour productivity in manufacturing in our sample of cities was just over 23% higher in 1920 than if specialisation had remained at the 1890 level. Table 2 develops some further aspects of this result while taking account of workers in manufacturing outside these cities whose productivity is assumed to be unaffected.

- The bottom line is that, in the absence of this increase in specialisation within cities, labour productivity growth in US manufacturing between 1890 and 1920 would have been almost 0.5 percentage points per year lower.

Table 1. Specialisation in US cities, 1890-1920

	1890	1920
Philadelphia	0.011	0.012
Chicago	0.012	0.013
Chicago	0.015	0.020
Cleveland	0.017	0.019
New Orleans	0.019	0.038
Albany, NY	0.025	0.048
Columbus, OH	0.028	0.045
Memphis	0.038	0.048
Savannah	0.043	0.067
Akron, OH	0.045	0.071

Note: The specialisation index of a city is defined as the average of city-industry specialisation indices across all industrial in a city. The city-industry specialisation index is calculated as a ratio of city-industry employment to total city employment

Source: US Census of Manufactures 1890, 1920.

Table 2. Counterfactual US manufacturing labour productivity in 1920

	Actual	1890 specialisation
Output in cities (\$bn.)	16.272	13.213
Output/worker in cities (\$)	3000.2	2436.2
Total output (\$ bn.)	23.842	20.783
Total output/worker	2816.5	2455.2
Labour productivity growth, 1890-1920 (% p.a.)	0.85	0.36

Source: Klein and Crafts (2015, Table 12)

If this specialisation gain was largely due to the decline in freight rates on railroads, as the literature suggests but has not yet shown, then this has important implications for one of the most famous episodes in cliometrics, namely, the debate on the social savings of US railroads that was triggered by Fogel (1964). Gains from increased specialisation in American cities would be an important externality in the transport-using sector – in the jargon of modern cost-benefit analysis, a ‘wider economic benefit’ – which is not captured by Fogel’s measurement technique.

What can policymakers today, interested in the ‘successful cities’ agenda, learn from this research? We think there are three important lessons:

- The evolution of cities does matter for the productivity agenda.
- Generally speaking, the most important productivity advantages of cities accrue from specialisation.
- Significant wider economic benefits from investment in transport infrastructure can result from induced changes in the structure of economic activity in urban areas.

It is important that these points are taken on board in cost-benefit analyses of putative investments in transport infrastructure, but they do need to be carefully quantified rather than simply asserted.

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