



The productivity of American cities: How densification, relocation, and greater mobility sustain the productive advantage of larger U.S. metropolitan labor markets



Shlomo Angel ^{*}, Alejandro M. Blei

The Urbanization Project, Stern School of Business, New York University, 196 Mercer Street, Floor PH, New York, NY 10012, USA

ARTICLE INFO

Article history:

Received 11 November 2015
 Received in revised form 26 November 2015
 Accepted 30 November 2015
 Available online 21 December 2015

Keywords:

Metropolitan transportation policy
 Labor markets
 Journey to work
 Agglomeration economies
 Scaling

ABSTRACT

The greatest productive advantage of modern-day American cities is that they form large and integrated metropolitan labor markets. We present new evidence on the importance of self-adjusting commuting and location patterns in sustaining the productive advantages of larger metropolitan labor markets, mitigating the difficulties in coping with their sheer size, and reducing the added burdens on their transportation infrastructure. As a result of these adjustments, the metropolitan labor market—defined as the *actual* number of jobs in the metropolitan area reached in less than a 1-hour commute—is almost twice in size in a U.S. city with a workforce twice the size. More particularly, in a U.S. metropolitan area with twice the population of another one, commute time should be expected to increase by a factor equal to the square root of 2. Instead, it only increases by *one-sixth* of that factor because of three types of adjustments that take place as cities grow in population: increases in residential density, locational adjustments of residences and workplaces to be within a tolerable commute range of each other, and increases in commuting speeds brought about by shifts to faster roads and transit systems. The policy implications of these findings are that the more integrated metropolitan labor markets are, the more productive they are. We should therefore support policies of two kinds: first, those that increase overall regional connectivity and that allow for speedier rather than slower commuting, for more rather than less commuting, and for longer rather shorter commuting to take advantage of metropolitan-wide economic opportunities; and second, policies that remove impediments to the locational mobility of residences and workplaces for all income groups so that they can easily relocate to be within tolerable commute range of each other.

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1. Introduction

It is generally understood that the main force propelling cities into being and then fueling their growth is their productivity. But in the heated debates on the future of our cities in general—and of our transportation systems and land use patterns in particular—the specific and indeed essential role of our urban transport networks and our urban spatial structure in maintaining and enhancing the productivity of our cities is often misunderstood or rendered ambiguous (see, e.g. Litman, 2014). That said, there appears to be growing interest in integrating economic development goals in transportation and land use planning in American metropolitan areas. A recent white paper issued by the U.S. Department of Transportation, for example, acknowledges that economic development—“a fundamental societal goal of promoting growth in prosperity, economic opportunity, and the population’s standard of living”—is “emerging as a priority topic in metropolitan area planning” (U.S. DOT, 2014, 1). It is our firm belief that a renewed focus on the

productivity of cities as a key objective in transportation and land use planning is indeed welcome. That said, the relationship between productivity on the one hand and transport and land use systems on the other is often misunderstood. The aim of this article is to bring a new understanding of this critical nexus to the fore.

How productive are American cities? The total amount of goods and services produced in the two largest metropolitan areas in America, New York and Los Angeles, in 2012—their combined Gross Domestic Product (GDP)—was 2.9% of that of the world at large. In comparative terms—to get a sense of the importance of the productive dimension of these cities—their combined GDP was also larger than that of India in that year, \$2.1 versus \$1.9 trillion (in current US\$, World Bank, 2014; BEA, 2013, Table 1). Surely, these two metropolitan giants had many productive advantages over other places.

One of their most important advantages was that they functioned as integrated economies, and they were more productive as integrated economies *because* they were large. Why? In large part because larger metropolitan areas have larger metropolitan labor markets: workers have access to a larger, more diversified and more specialized pool of jobs, and firms have access to a larger, more diversified and more

^{*} Corresponding author.

E-mail addresses: sangel@stern.nyu.edu (S. Angel), ablei@stern.nyu.edu (A.M. Blei).

Table 1

Reasons for intra-county move by type of move, 2008–2009.

Source: U.S. Census, 2011. Geographical Mobility 2008 to 2009, P20-565, November, Table 7, 16.

Reason to move	Percent
Family-related reasons	26.5
Change in marital status	5.5
To establish own household	11.6
Other Family reason	9.5
Employment related reasons	8.9
New job or job transfer	2.1
To look for work or lost job	1.0
To be closer to work/easier commute	5.0
Retired	0.2
Other job-related reasons	0.7
Housing-related reasons	57.2
Wanted to own home, not rent	6.6
Wanted new or better home/apartment	18.6
Wanted better neighborhood/less crime	6.2
Wanted cheaper housing	13.9
Other housing-related reason	11.9
Other reasons	7.5
To attend or leave college	1.5
Change of climate	0.1
Health reason	1.4
Natural disaster	0.5
Other reason	4.1

specialized pool of workers. These advantages—coupled with other agglomeration economies or, more specifically ‘urbanization economies’, such as shared knowledge, shared services and suppliers, shared infrastructure and facilities, shared risk of rapid changes in firm size, or increased competition—give larger cities their productive edge. As our study will demonstrate, metropolitan labor markets in the United States are held together by nimble and self-adjusting commuting patterns between self-adjusting residence and workplace locations that ensure that larger cities do not lose their productive advantage because of the added costs of long commuting trips along congested transport networks. And while commuting constituted only 28% of person vehicle miles traveled (VMT) by all modes (data for 2009, AASHTO, 2013, Table 2.1, 9), highly efficient commuting and location patterns that keep workers and workplaces within an acceptable commute range lie at the heart of the high productivity of American cities in general, and its larger metropolitan agglomerations in particular.

It stands to reason, therefore, that concerns for the effective contribution of commuting and location patterns to sustaining the continued productivity of American cities must guide future urban transport and land use policy, informing decisions regarding government spending, regulation, taxation, investment, and research. The central aim of this article is to present evidence that will shed new light on the key role that self-adjusting commuting and location patterns play in supporting metropolitan labor markets and hence in sustaining the productivity of cities. This evidence will hopefully inform a more pragmatic and more realistic conversation on the possible futures of urban transportation and land use, a conversation that may determine whether we can make the commuting and location patterns of the future—so critical to maintaining and enhancing the productivity of our cities—more efficient *and* more sustainable at the same time. At the end of the day, the productivity of our cities must be harnessed to secure their environmental sustainability, and our cities must become more sustainable so as to maintain their productivity.

The article is divided into three sections. The first section focuses on the relationship between metropolitan labor markets and city size. We introduce data from the U.S. Bureau of Economic Analysis for 347 U.S. metropolitan areas to show that the larger the city, the more productive its workforce. We argue that *actual* versus potential access to jobs is the key to understanding the size of metropolitan labor markets. We find that the metropolitan labor market—defined as the actual number of jobs in the metropolitan area reached in less than a 1-hour commute—increased by 97%, i.e. almost doubled, in a U.S. city with

twice the workforce of a smaller one, while the *share* of jobs that were reached within that time declined by a meager 1%.

The second section of the article introduces and discusses the relationship between commuting time and city population size. In theory, other things being equal, average commute time should increase by the square root of 2 (i.e. by 41%) for a city twice the size in population, as we shall explain below. The key finding in this section is that actual commute time in a U.S. metropolitan area with twice the population of a smaller one is about one-sixth of the expected increase of 41%. We believe that observed actual increases are much lower because of three types of adjustments that take place in larger cities: increases in average residential density, the locational adjustments of residences and workplaces to be within a tolerable commute range of each other, and increases in commuting speeds brought about by shifts to faster roads or modes. Larger U.S. cities are indeed denser than smaller ones, bringing workers closer to their jobs than they would be if densities were the same. Workers and their workplaces in larger U.S. cities move closer to each other to mitigate the increased average distance between any two locations in their larger areas, so that the time and distance of commutes remain within workers’ *tolerable commute range*, their preference to remain within a limited time and distance from their workplaces when they select a residence or a workplace. And commuters in larger cities travel at higher average speeds on faster roads—freeways, for example, as against arterial roads—so that average commuting time increases at a slower rate than average commuting distance when city populations increase. The compound result of these three mutually reinforcing adjustments is that in a city with twice the population of a smaller one, commuting time is not 41% higher, as expected, but only 7% higher.

The third section of the article presents our conclusions and their implications for future urban transportation and land use policy in American cities.

In Annex A, we map and list the 40 cities in our stratified sample.¹

2. Metropolitan labor markets and city size

2.1. The larger the city, the more productive its workforce

Urban theorists in general, and the economists among them in particular, have long sought to explain the emergence and growth of cities. Economists, as early as Smith (1776) and Marshall (1890), recognized that cities bestow productivity advantages on both firms and workers. Marshall suggested three possible sources of these advantages: sharing of inputs, labor market pooling, and knowledge spillovers. More recent research (for a survey of the literature, see Duranton & Puga, 2004; Rosenthal & Strange, 2004) examines a wider range of possible sources and there is now a broad literature focusing on different sources. Duranton and Puga classify these sources into sharing, matching, and learning mechanisms. Sharing includes sharing infrastructure and facilities, input suppliers, larger local markets, and risks as well as gains from variety. Matching mechanisms focus on the matching of firms to workers that allows for specialization, the focus of the present article. Learning is facilitated by bringing together large number of people, enhancing both knowledge generation and its diffusion. Other scholars focus on increased competition and the resulting survival of more productive firms as additional mechanisms for improving productivity (e.g. Combes, Duranton, Gobillon, Puga, & Roux, 2012), or on industrial culture and local institutions as important contributors to productivity differences (e.g. Saxenian, 1994). Most of the literature suffers from the inherent difficulty in isolating the partial contributions of these

¹ A more detailed Annex introducing the data sets and discussing the methodology underlying this study can be found online at: http://marroninstitute.nyu.edu/uploads/content/Commuting_and_the_Productivity_of_American_Cities_20_December_2014.pdf, pp. 32–39.

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