Global Cities Initiative
A JOINT PROJECT OF BROOKINGS AND JPMORGAN CHASE

Mapping Freight:
The Highly Concentrated Nature of Goods Trade in the United States

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“Policymakers must explore strategies that better support and prioritize infrastructure investments within the nation’s freight system.”

Findings

The United States is the world’s largest economy, as well as its preeminent trading power. Each year the country exports and imports over $3 trillion worth of international goods, while the domestic market encompasses an astonishing $17 trillion in goods trade between regions—amounting to a combined $20 trillion.[1] These trading relationships serve as a sparkplug to the national economy, providing access to distant markets, helping U.S. firms take part in global value chains, and spurring innovative value creation and industrial specialties. Standing at the center of this invaluable trade network is the country’s freight infrastructure, an expansive set of transportation assets that help match supply and demand between separate regions.

Considering the importance of goods trade to the country, strikingly little is known about which regions trade with one another. This information gap limits the country’s ability to coordinate freight policies and investments. Overall, the lack of a well-defined, networked approach to freight infrastructure continues to hold back needed projects and hinder long-term economic growth. To address this deficiency, this report analyzes domestic and international goods trade data from 2010, revealing that:

- **The country’s 100 largest metropolitan areas drive national goods trade, with more than 80 percent of all goods either starting or ending in these areas.** In total, $16.2 trillion in domestic and international goods flow annually through the largest metropolitan areas, which specialize in moving valuable advanced industrial products like electronics and transportation equipment.
- **Just 10 percent of the country’s trade corridors move 79 percent of all goods, the most valuable of which are concentrated in the country’s 100 largest metropolitan areas.** The vast majority of the nation’s goods trade tends to be highly concentrated in corridors between the largest metropolitan areas. For example, New York and Philadelphia ($55.9 billion), Los Angeles and Riverside ($51.0 billion), and San Francisco and San Jose ($29.8 billion) are among the single largest corridors within the national network.
- **Every region of the country relies on at least one major network hub to move large volumes of goods along different corridors domestically and internationally.** Chicago, New York, and Los Angeles are the clear hubs of the entire national network, while other large metropolitan areas like Houston and Detroit are centralized traders based upon specialties in certain commodities. In turn, these large and diverse markets often represent critical points for production, consumption, and distribution in the national network—and highlight the need to prioritize places for infrastructure investment.
- **Metropolitan areas tend to trade more goods with each other when they are located close together, employ a sizable number of logistics workers, and house large populations.** Controlling for all other factors, each additional 100 miles separating two regions reduces expected trade volumes by 3.2 percent. Every additional 10,000 logistics workers increases expected trade between two regions by over 12 percent, and an additional one million residents increases expected trade volumes by over 1.5 percent. For example, Atlanta and Memphis rank among the large, centrally located distribution centers that play a critical role in guiding national trade.
- **With over 77 percent of the nation’s freight moving between different states, the United States must establish a more coordinated freight strategy across all levels of the public and private sectors.** Since most regions move goods across state lines—totaling $15.2 trillion annually—they depend on a well-connected freight network to reach distant markets and drive economic growth. Some metropolitan areas, such as Las Vegas and Baltimore, exchange over 90 percent of their goods beyond their respective states.

This report explores the major trade corridors connecting different regions of the country, revealing the importance of particular places in the nation’s freight network. Since the most valuable corridors are often concentrated among the nation’s largest metropolitan areas, policymakers must fundamentally reorient freight policy to support these markets.

Background

Each year, the United States moves over $20 trillion in goods weighing over 17 billion tons between hundreds of metropolitan, non-metropolitan, and international regions.[2] It does so using an extensive network of freight assets: over 4 million miles of highways, local roads, railways, navigable waterways, and pipelines; hundreds of seaports and airports; and thousands of intermodal facilities to tie the network together.[3] Without this network, it would be impossible for regional economies to trade goods and reach their full economic potential.[4]

Managing this network rests on the shoulders of both the public and private sectors, which share various responsibilities in planning and policy development. The public sector owns and operates assets like airports and interstate highways, while also regulating local land use and national safety standards.[5] In contrast, the private sector operates vehicles and other equipment to move goods, while owning distribution centers and other freight assets such as rail lines.[6]

Today, this public-private relationship is at a critical juncture. From the federal to the local level, freight policy has frequently fallen short with its private sector partners, moving forward without a central purpose or set of clearly defined economic priorities.[7] As a consequence, metropolitan economies—and the firms located within them—may increasingly be at a competitive disadvantage with their global peers.

Federally, the national strategy is outdated and overly stovepiped. National *transportation* policy focuses on connectivity, epitomized through the National Highway Trust Fund's effort to build the interstate highway system and forge physical bonds across the country. In many ways, that investment has proven a great success, but it treats every state and metropolitan area as relatively equal traders within the larger national system.[8] To make matters worse, there is no dedicated freight investment program designed to support the country's multimodal freight network. National *trade* policy also provides little clarity concerning freight, concentrating instead on international agreements and where goods enter or exit the country. This approach ignores domestic trade between metropolitan areas and, in particular, the supply chains that connect metro areas to one another and to U.S. ports.

Freight strategies have also frequently been lacking at the state and local levels. Although states physically built the national highway system by connecting major population centers to one another and to rural production hubs, many did not necessarily prioritize maintenance or new capacity around specific economic criteria once the original system was complete.[9] Meanwhile, metropolitan policies continue to focus on personal transportation needs, such as commute times, and often overlook the freight demands of tradable industries.[10] This leaves goods-trading and logistics firms to cover the costs of an inefficiently planned network, such as continued bottlenecks in key trading corridors or outdated technology like radar-based aviation.[11]

As a result, public and private leaders have not only struggled to develop freight strategies that are responsive to national concerns, but they have also failed to tailor these policies at a local level—a serious shortcoming given the central role of metropolitan economies.

Indeed, the nation's 100 largest metropolitan areas serve as its primary consumers of raw commodities, its biggest producers of manufactured goods, and its leading exporters and importers.[12] Moreover, their specialization in advanced industrial (AI) commodities like precision instruments, pharmaceuticals, and electronics is central to the national economy, driving future production and innovation.[13] Metropolitan areas forge strong connections with each other—both within and beyond the country's borders—to develop unique industrial specialties and power regional output.[14] This connectivity strengthens the metropolitan presence in global value chains and leads to long-term economic gains through globally coordinated goods production, consumption, and distribution.[15]

To coordinate freight strategies more effectively, it is critical that policymakers understand how trade works at the subnational scale. Mapping trade networks—assessing exactly who trades with one another, in what amounts, and in which commodities—can not only help guide future planning efforts and investment strategies at the national, state, and local levels, but can also clarify specific trade corridors and gateways across the country. Analyzing networks at the metropolitan level can also help leaders better understand how certain economic indicators—like industrial output and employment—drive trade among specific regions. Ultimately, with a more thorough awareness of how these networks function, leaders can start to craft improved, targeted transportation policies that support the physical movement of goods and advance long-term economic goals.

Through a variety of statistical measures, this report explores how network data can help metropolitan areas better understand their place in goods trade and inform the development of comprehensive freight strategies nationally. After briefly discussing the research methodology, the report describes the concentration of the nation's goods trade network along specific trade corridors and between specific metropolitan areas. It then examines regional trade connections in the domestic and international marketplace, judging these trade levels based on several economic factors, including output and employment. The report also reveals the highly interconnected nature of this metropolitan network across state lines, revealing the need for a coordinated approach. Finally, the report concludes with a discussion of implications for freight policy throughout a federalist system.

Methodology

As with previous papers in the Metro Freight series, this report concentrates on the movement of goods between different metropolitan areas, non-metropolitan areas, and their international counterparts (known as "intermetropolitan" trade). As such, this trade aggregates the exchange of products among all industries and private households present in these places. By focusing on the physical sites of production and consumption—as opposed to just freight hubs and ports—the report examines the economic connections underlying the nation's freight movement.

This report uses a unique database, developed by Brookings and the Economic Development Research Group (EDR), to examine goods traded among different regions. While the U.S Department of Transportation's Freight Analysis Framework (FAF) serves as a statistical foundation, the database defines goods movement at a more precise metropolitan scale, measuring the total value and weight of goods transported to, from, and within the United States in 2010. These domestic and international movements can be seen across 17 commodity groups and seven transportation modes. Due to changes in FAF accounting between versions, the database only contains one statistical year and does not permit longitudinal analysis.

The database includes the exchange of goods across 409 domestic areas (361 metropolitan areas and 48 state remainders) and 40 international geographies (18 countries, 11 larger country groups, and 11 continental remainders). These exchanges are viewed in terms of the aggregate value of trade between two regions. In this sense, all goods exchanges between two distinct places are counted in each direction—also known as bilateral trade. In some instances, trade is analyzed within specific commodity groups. To limit statistical noise between two regions that trade few goods, many sections of this paper analyze only those trading corridors worth at least $1 million—equal to roughly 88,000 unique combinations.

Throughout the report, several additional measures help further illustrate these patterns in intermetropolitan goods movement. To measure the relative size of a specific trade corridor or collection of corridors, shares are used via concentration statistics. To determine a region's relative position within national trade, centrality measures create comparisons among places. To isolate the effects of other economic indicators on the aggregate size of trade corridors, the report uses a fixed-effects panel regression model. Finally, to understand the extent to which intermetropolitan trade integrates the national economy, the report measures interstate trade by assigning each metropolitan area to a particular state. For multistate metropolitan areas, trade volumes are assigned proportionally to the distribution of population within each state. For a complete discussion of this report's methodology, see Appendix A.

Key Terms

Region: Any subnational geography based on three types of metropolitan area definitions.[16] The first group is the 100 largest metropolitan areas, as measured by population from the 2010 decennial census. The next includes all other metropolitan areas, which for this project includes another 261 areas.[17] The final group is the remainder of the country, referenced as non-metropolitan areas. Any reference to an assembly of international countries is written as "international region."

Goods Trade: The physical exchange of products or commodities between two distinct trading partners in different regions. These exchanges encompass the full range of commodities, from the rawest natural resources, like stones, to the most advanced manufacturing products, such as aerospace equipment.

Trade Corridor: Any bilateral goods trade between a given region and either another domestic region or one of the 40 international geographies. This may refer to either aggregate trade or commodity-specific trade. Note that the value of goods exchanged along these corridors does not include movements through intermediary points of distribution.

Regional Trade Networks: The aggregation of all trade corridors moving in and out of a given region or the entire country. Any reference to the aggregation of all national trade corridors is written as "national trade network."

Trade Volume: The total quantity of goods traded in and out of a particular region. Volume is measured exclusively by value (in U.S. dollars). This particular report measures trade in both directions.

Commodities: This survey uses a collection of 17 commodities to better describe the goods that regions trade: agricultural products, stones/ores, energy products, chemicals/plastics, wood products, textiles, metals, tools and manufacturing products, machinery, electronics, transportation equipment, precision instruments, pharmaceuticals, furniture, waste, mixed freight, and unknown. For more information on these commodity groups, see Appendix A.

Concentration: The share of trade volume moved along a single or collection of specific trade corridors, relative to either an entire regional trade network or the national trade network. In certain instances, concentration is reported using the GINI coefficient. GINI coefficients are a measure of equality in a statistical group, with 0 representing equal concentration across all places and 1 representing total concentration in one place.

Centrality: A region's relative position in the national trade network, with a higher number of trade connections and greater trade volume leading to higher scores. This paper uses weighted degree centrality to calculate regional performance, with total bilateral trade serving as the weighted variable. Since it is a relative measure, centrality is reported along an indexed scale—typically percentage—to facilitate comparisons between regions.

Findings

A. The country's 100 largest metropolitan areas drive national goods trade, with more than 80 percent of all goods either starting or ending in these areas.

The national trade network—which includes the exchange of goods between different metropolitan areas, non-metropolitan areas, and foreign countries—moved $20.3 trillion worth of goods in 2010.[18] The sheer volume of trade confirms that producing and moving goods is still critical to the national economy, even as service activities grow in importance over time.[19] For example, since aggregate trade exceeds national GDP of $15 trillion, it demonstrates how many different markets conduct value-added activity on goods as they move from origin to final destination. Considering this volume of total trade, an efficient, well-connected infrastructure network is a key component to facilitating this massive exchange of goods.

The country's 100 largest metropolitan areas operate at the center of this expansive network. In total, trade corridors that either start or end in these areas move more than $16.2 trillion of the nation's $20 trillion in goods annually. That 80 percent trade share outpaces those same metro areas' two-thirds share of the country's population and 75 percent share of national economic output.[20] The largest single component of the value comes from domestic trade *between* the 100 largest metropolitan areas ($6.3 trillion), followed by trade with other metropolitan areas ($4.2 trillion) and trade with non-metropolitan areas ($3.7 trillion). While international trade represents a smaller amount by comparison ($1.9 trillion), the country's largest metropolitan areas still rely on a constant stream of goods flowing to and from a variety of foreign trading partners, such as China, Canada, and Mexico, which makes access to ports and border crossing facilities a major priority.

These large metropolitan areas also serve as primary hubs for trade within smaller regions. For example, other metropolitan and non-metropolitan regions each transport over 57 percent of their goods to and from these 100 largest markets. The net result is that only $4.1 trillion in total domestic and international trade does not move through one of the 100 largest metropolitan areas.

Table 1. National Goods Trade Network by Origin and Destination Type, 2010 ($ millions)

		Destination				
		100 Metro Areas	Other Metro Areas	Non-Metro Areas	International	Total
Origin	100 Metro Areas	$6,345,676.8	$2,120,203.7	$1,755,438.9	$746,583.5	$10,967,902.9
	Other Metro Areas	$2,074,231.9	$824,166.1	$754,764.3	$258,508.2	$3,911,670.6
	Non-Metro Areas	$1,967,359.5	$865,213.4	$526,407.0	$240,862.9	$3,599,842.7
	International	$1,183,735.7	$363,097.0	$267,598.8	---	$1,814,431.4
	Total	*$11,571,003.9*	*$4,172,680.2*	*$3,304,208.9*	*$1,245,954.6*	*$20,293,847.6*

Source: Brookings analysis of EDR and Census data

As such, the 100 largest metropolitan areas have a broad impact felt across the freight infrastructure network, moving all types of goods between regions. Their dominance is particularly notable in AI products, where over 82 percent of trade either starts or ends in large metropolitan areas. Large metro areas' share of trade in pharmaceuticals, electronics, and precision instruments jumps to over 85 percent, reflecting how many of these areas serve as essential manufacturing or logistics hubs for such products. From pharmaceuticals in Memphis to electronics in San Diego and precision instruments in Boston, many metropolitan areas thrive on these valuable exchanges.

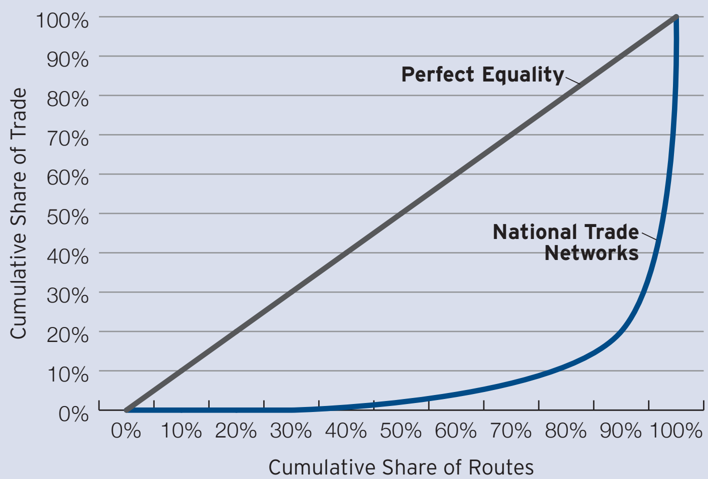
Although they may specialize in moving these AI products, the 100 largest metropolitan areas are responsible for moving the majority of all other commodities as well. Over 80 percent of the country's manufactured goods—ranging from metals and tools to textiles and furniture—are transported through large metro areas, and markets as diverse as Los Angeles and Greensboro help circulate a wide assortment of goods to distant regions. Likewise, three-quarters of the nation's energy products cycle through these areas, from heavy consumer markets like Miami to refinery centers like Philadelphia. Even in bulk commodities such as stones and ores, trade corridors connecting to these metropolitan areas represent, at minimum, 69 percent of the nation's total, reaffirming their importance to an integrated freight system.

B. Just 10 percent of the country's trade corridors move 79 percent of all goods, the most valuable of which are concentrated in the country's 100 largest metropolitan areas.

Metropolitan areas forge stronger economic connections with each other when they trade goods, and large, diverse economies like New York and Los Angeles are often at the center of these exchanges.[21] Supported by clusters of industries that fuel production and innovation, these markets rely on an efficient infrastructure system to share their ideas, distribute their goods, and accelerate growth. In this way, the U.S. national trade network hinges on a small set of trade corridors—primarily between large metropolitan areas—to support these economic activities. That makes the national trade network highly concentrated, reflecting how certain metropolitan economies are the country's largest economic entities.

Charting the share of national trade among different corridors reveals this sizable level of concentration (Figure 1). Among the roughly 88,000 corridors found in the national trade network, just 10 percent are responsible for moving nearly 79 percent of all goods, with the most valuable corridors concentrated in the country's 100 largest metropolitan areas. This is especially apparent among the top 1 percent, where just 888 corridors contributed nearly 38 percent of all traded value. By contrast, the bottom 90 percent of these corridors—equal to 79,965 unique combinations of places—traded only 21 percent of U.S. goods.[22] This aggregate concentration level creates a highly imbalanced GINI coefficient of 0.85, confirming that goods trade in the U.S. is highly reliant on a small number of metropolitan connections.[23] Moving forward, this will be a key concern for national freight policy, which has thus far treated all freight corridors as relatively equal contributors to goods movement.

Figure 1. Share of National Goods Trade, by All Trade Corridors Exceeding $1 Million, 2010



Note: The Lorenz curve of the national trade network equates to a 0.85 GINI coefficient.
Source: Brookings analysis of EDR and Moody's Analytics data

Table 2. Share of National Goods Trade, All Trade Corridors Exceeding $1 Million, 2010

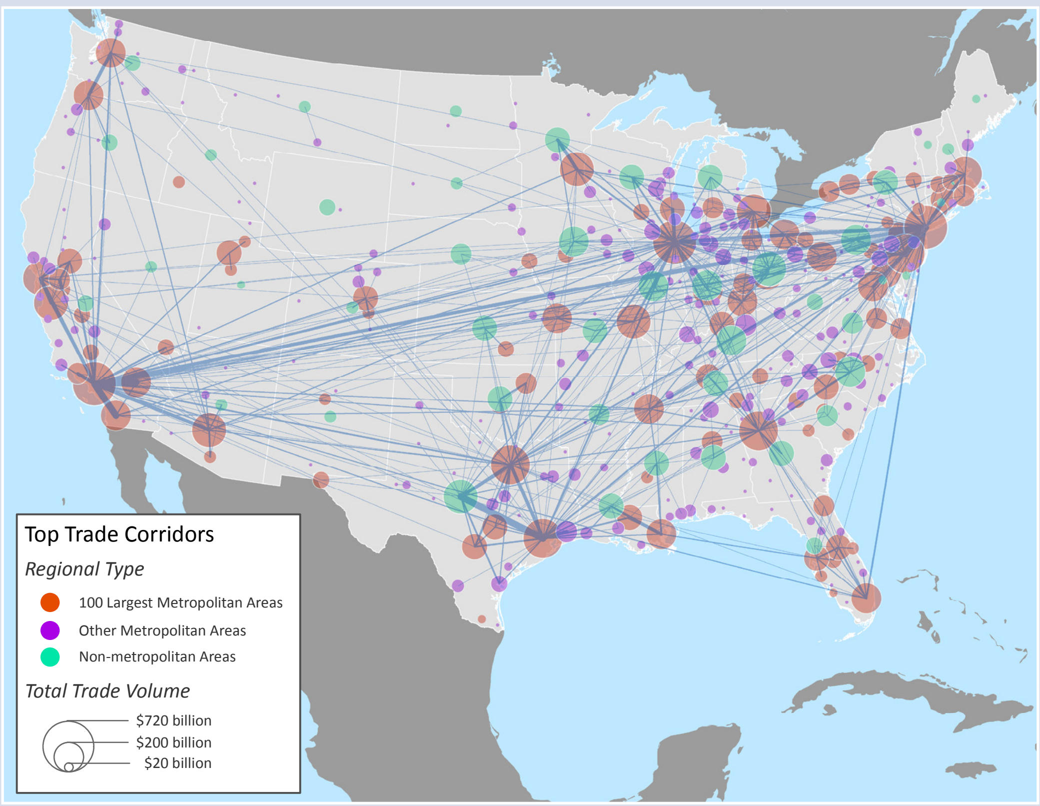
	Number of Corridors	Total Traded Value (*$ mil*)	Share of All Traded Goods Value	Average Value (*$ mil*)
Bottom 25th Percentile	22,213	$56,225.9	0.5%	$2.5
Bottom 50th Percentile	44,425	$256,549.8	2.2%	$5.8
Bottom 75th Percentile	66,638	$954,285.2	8.2%	$14.3
Bottom 90th Percentile	79,965	$2,468,954.7	21.1%	$30.9
Top 10th Percentile	8,885	$9,212,707.5	78.9%	$1,036.9
Top 1st Percentile	888	$4,411,169.7	37.8%	$4,967.5

Source: Brookings analysis of EDR and Census data

The 100 largest metropolitan areas are the most common actors in these high-value trade corridors. Of the 8,885 combinations that form the top 10 percent of trade corridors, 6,595 either start or end in these metropolitan areas. The share is even larger within the top 1 percent of corridors, where 767 of a possible 888 corridors either start or end in these areas.

Figure 2 further illustrates these patterns, drawing the top 1 percent of domestic corridors. New York and Philadelphia are the largest trading partners, moving $55.9 billion in goods, primarily based on their complementary industries in energy, chemicals, pharmaceuticals, and mixed freight. Likewise, three of the ten biggest corridors form a geographic cluster between Los Angeles and its metropolitan neighbors of Riverside ($51.0 billion), San Diego ($36.8 billion), and Oxnard ($29.6 billion). Another regional cluster exists in Texas, where Houston and Dallas form strong trade ties with one another and the non-metropolitan parts of the state, especially around chemicals, energy, and electronics. Some of the most valuable corridors cover long distances, whether domestically like New York-Los Angeles ($24.4 billion) or internationally like San Jose-China ($26.2 billion). Table 3 includes the full list of the 25 most valuable trade corridors—each of which includes at least one of the 100 largest metropolitan areas—and their most valuable commodity.

Figure 2. Top 1 Percent of Trade Corridors Based on Value, Domestic Corridors Only, 2010



Note: Entire top 1 percent of corridors include 888 corridors and over $4.4 trillion in total traded goods value.
Source: Brookings analysis of EDR and Census data

Table 3. Most Valuable National Trade Corridors, 2010 ($ millions)

Rank	Trader A	Trader B	Total Value	Highest Traded Commodity	Value
1	New York-Northern New Jersey-Long Island, NY-NJ-PA	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	$55,902.9	Mixed Freight	$13,812.9
2	Los Angeles-Long Beach-Santa Ana, CA	Riverside-San Bernardino-Ontario, CA	$50,970.8	Energy Products	$20,854.1
3	Houston-Sugar Land-Baytown, TX	Rest of Texas	$47,991.3	Energy Products	$25,047.4
4	Los Angeles-Long Beach-Santa Ana, CA	San Diego-Carlsbad-San Marcos, CA	$36,818.0	Mixed Freight	$5,396.3
5	San Francisco-Oakland-Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	$29,786.7	Electronics	$4,867.9
6	Los Angeles-Long Beach-Santa Ana, CA	Oxnard-Thousand Oaks-Ventura, CA	$29,548.2	Energy Products	$10,851.4
7	Baton Rouge, LA	New Orleans-Metairie-Kenner, LA	$26,474.8	Energy Products	$18,520.4
8	China	San Jose-Sunnyvale-Santa Clara, CA	$26,225.2	Electronics	$20,706.6
9	Dallas-Fort Worth-Arlington, TX	Houston-Sugar Land-Baytown, TX	$25,167.2	Transportation Equipment	$5,559.0
10	China	Los Angeles-Long Beach-Santa Ana, CA	$24,733.3	Electronics	$8,187.0
11	Los Angeles-Long Beach-Santa Ana, CA	New York-Northern New Jersey-Long Island, NY-NJ-PA	$24,379.3	Textiles	$5,792.4
12	China	New York-Northern New Jersey-Long Island, NY-NJ-PA	$23,925.0	Electronics	$6,091.4
13	Dallas-Fort Worth-Arlington, TX	Rest of Texas	$23,156.9	Agricultural Products	$4,947.8
14	Chicago-Joliet-Naperville, IL-IN-WI	Milwaukee-Waukesha-West Allis, WI	$22,984.4	Mixed Freight	$5,464.8
15	Beaumont-Port Arthur, TX	Houston-Sugar Land-Baytown, TX	$22,034.5	Energy Products	$10,043.5
16	Baltimore-Towson, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV	$20,484.5	Mixed Freight	$3,564.9
17	Los Angeles-Long Beach-Santa Ana, CA	Phoenix-Mesa-Glendale, AZ	$20,419.8	Agricultural Products	$3,415.2
18	Minneapolis-St. Paul-Bloomington, MN-WI	Rest of Minnesota	$20,315.3	Agricultural Products	$6,853.6
19	Chicago-Joliet-Naperville, IL-IN-WI	New York-Northern New Jersey-Long Island, NY-NJ-PA	$19,593.6	Electronics	$2,783.1
20	Canada	New York-Northern New Jersey-Long Island, NY-NJ-PA	$19,465.5	Energy Products	$3,470.1
21	Canada	Houston-Sugar Land-Baytown, TX	$18,764.0	Energy Products	$10,661.8
22	Modesto, CA	Stockton, CA	$17,314.8	Agricultural Products	$5,600.6
23	Houston-Sugar Land-Baytown, TX	Mexico	$17,283.9	Energy Products	$7,752.5
24	Los Angeles-Long Beach-Santa Ana, CA	San Francisco-Oakland-Fremont, CA	$17,047.2	Agricultural Products	$2,634.6
25	Canada	Chicago-Joliet-Naperville, IL-IN-WI	$16,873.7	Energy Products	$3,412.5

Source: Brookings analysis of EDR and Census data

Even when regions outside the 100 largest metropolitan areas appear among the most valuable corridors—whether domestic or international—they still typically trade with a large metropolitan area.

For the country's smaller metropolitan areas, the most valuable corridors frequently reflect a strong connection with either the closest large metropolitan area or a national leader in a complementary industry. Strong local ties are common across the country, ranging from Manchester, NH–Boston ($6.7 billion) to Rockford, IL-Chicago ($9.7 billion) to Santa Barbara, CA–Los Angeles ($6.7 billion). Not surprisingly, mixed freight, which includes miscellaneous food and supplies for offices and stores, leads trade along these highly populated corridors. On the other hand, Durham, NC ranks among the areas with more specialized industrial connections, forging a strong link with Memphis ($4.9 billion) primarily based on pharmaceuticals. Meanwhile, Beaumont, TX ($22.0 billion) and Corpus Christi, TX ($8.1 billion) are active traders with Houston, led by their complementary energy-related industries and close proximity.

Rural and micropolitan parts of the country also tend to trade heavily with nearby economic centers. The biggest trade partner for non-metropolitan parts of Minnesota is Minneapolis ($20.3 billion) and non-metropolitan parts of Georgia do the same with Atlanta ($14.5 billion). Similar patterns exist for Ohio with Columbus ($14.5 billion), North Carolina with Charlotte ($13.2 billion), and Oklahoma with both Oklahoma City ($10.3 billion) and Tulsa ($8.8 billion). This is a consistent pattern across the country (see Box A).

Box A. The Ties That Bind—Rural Trade Corridors Rely on Metropolitan Economies

In many instances, the United States' role as a goods-trading powerhouse begins in the country's rural and micropolitan areas. These places are primary sources of critical industrial inputs like raw energy and lumber. They also produce the commodities that make daily life possible, including agricultural products for food and textiles to make clothing. Although these regions house only 51 million people, they generate an annual trade surplus of over $134 billion.[24]

However, that enormous surplus would not be possible without major consumers and logistics clusters in the country's population centers. Trade with major cities and suburban areas accounts for 84 percent of all non-metropolitan trade; these exchanges range from connections with large markets like New York and Los Angeles to smaller ones like Anchorage and Cedar Rapids. These corridors are often concentrated within the same state and forge connections between a state's rural hinterlands and its metropolitan centers.

These trade patterns underscore the economic interdependence between metropolitan and non-metropolitan areas. Both sides require the country's expansive freight network to operate at peak efficiency, whether initiating supply chains in rural areas or coordinating global value chains from metropolitan areas. It also means that traffic backup at an intermodal center or on a congested highway—the majority of which are in large metropolitan areas—creates costs for traders across the country. In this way, it is critical that rural areas recognize the benefits they receive from freight investments elsewhere.

Box B. Examining the Global Reach of Metropolitan Trade Networks

While the majority of goods traded by U.S. metropolitan areas are sourced domestically, global connectivity represents a strategic priority for many markets.[25] By promoting a mix of export-led growth and capitalizing on cost-effective imports, these areas are able to seize economic opportunities in a variety of developed and developing countries.[26] Together, the 100 largest metropolitan areas represent the driving force behind these international networks, requiring efficient infrastructure to guide future flows of commerce.

For example, Canada, China, Mexico, and Japan consistently rank as the top international trading partners for most U.S. regions. These four countries alone account for more than half of all U.S. international trade ($1.6 trillion, or 53.4 percent). Some metropolitan areas, like San Jose ($53.2 billion) and Sacramento ($8.3 billion), trade over 70 percent of their international goods with just these four countries. Meanwhile, not one of the 100 largest metropolitan areas moves less than 40 percent of its international goods with these four countries combined. This is particularly noticeable among the country's 25 most valuable international trade corridors (Table 4), in which all but one corridor includes these four countries.

Table 4. Most Valuable International Trade Corridors, 2010 ($ millions)

Rank	Trader A	Trader B	Total Value	Highest Traded Commodity	Value
1	San Jose-Sunnyvale-Santa Clara, CA	China	$55,902.9	Electronics	$20,706.6
2	Los Angeles-Long Beach-Santa Ana, CA	China	$50,970.8	Electronics	$8,187.0
3	New York-Northern New Jersey-Long Island, NY-NJ-PA	China	$47,991.3	Electronics	$6,091.4
4	New York-Northern New Jersey-Long Island, NY-NJ-PA	Canada	$36,818.0	Energy Products	$3,470.1
5	Houston-Sugar Land-Baytown, TX	Canada	$29,786.7	Energy Products	$10,661.8
6	Houston-Sugar Land-Baytown, TX	Mexico	$29,548.2	Energy Products	$7,752.5
7	Chicago-Joliet-Naperville, IL-IN-WI	Canada	$26,474.8	Energy Products	$3,412.5
8	Chicago-Joliet-Naperville, IL-IN-WI	China	$26,225.2	Electronics	$4,698.0
9	Detroit-Warren-Livonia, MI	Canada	$25,167.2	Transportation Equipment	$11,251.8
10	Los Angeles-Long Beach-Santa Ana, CA	Mexico	$24,733.3	Electronics	$4,624.3
11	San Jose-Sunnyvale-Santa Clara, CA	Mexico	$24,379.3	Electronics	$11,911.0
12	Houston-Sugar Land-Baytown, TX	China	$23,925.0	Electronics	$4,791.2
13	Dallas-Fort Worth-Arlington, TX	China	$23,156.9	Electronics	$4,399.2
14	Los Angeles-Long Beach-Santa Ana, CA	Canada	$22,984.4	Energy Products	$4,296.1
15	New York-Northern New Jersey-Long Island, NY-NJ-PA	Mexico	$22,034.5	Electronics	$3,111.2
16	Chicago-Joliet-Naperville, IL-IN-WI	Mexico	$20,484.5	Electronics	$2,398.9
17	San Francisco-Oakland-Fremont, CA	China	$20,419.8	Electronics	$4,604.3
18	Seattle-Tacoma-Bellevue, WA	China	$20,315.3	Transportation Equipment	$2,995.4
19	San Francisco-Oakland-Fremont, CA	Canada	$19,593.6	Energy Products	$6,282.4
20	San Francisco-Oakland-Fremont, CA	Mexico	$19,465.5	Energy Products	$4,510.2
21	Houston-Sugar Land-Baytown, TX	Remainder of Western Asia	$18,764.0	Energy Products	$7,995.4
22	Dallas-Fort Worth-Arlington, TX	Canada	$17,314.8	Transportation Equipment	$1,703.6
23	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	Canada	$17,283.9	Energy Products	$2,340.1
24	Dallas-Fort Worth-Arlington, TX	Mexico	$17,047.2	Electronics	$3,328.8
25	Boston-Cambridge-Quincy, MA-NH	China	$16,873.7	Electronics	$3,266.3

Source: Brookings analysis of EDR and Census data

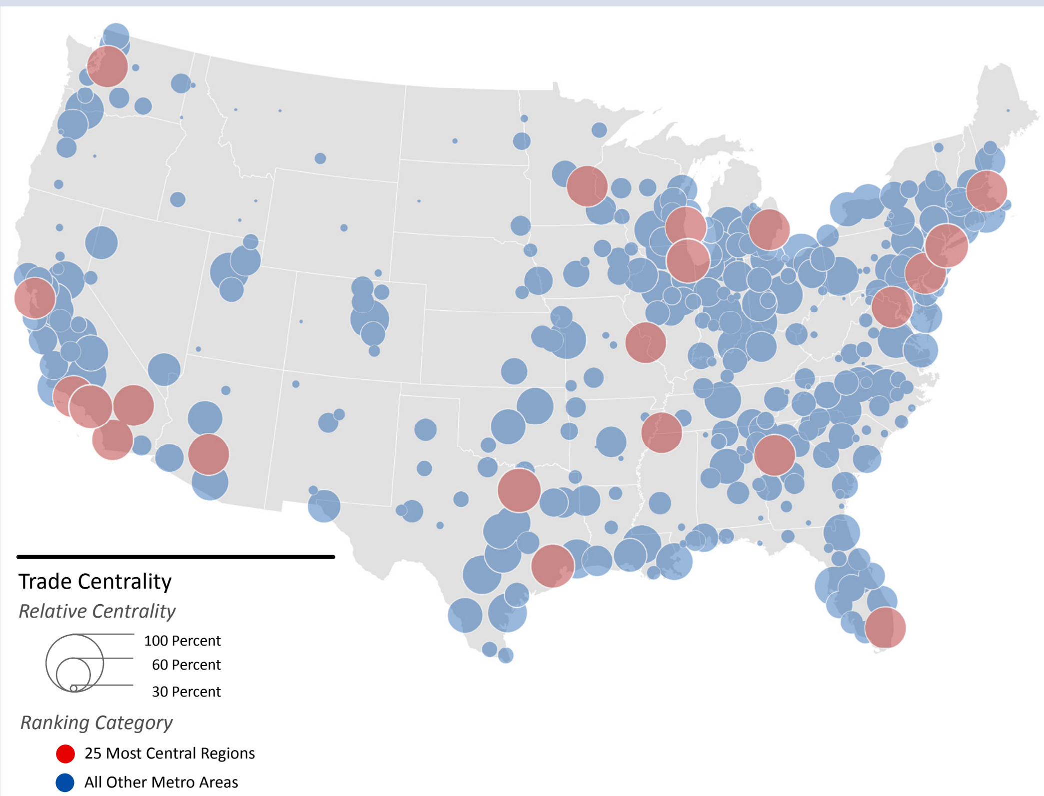
Still, other international trade partners stand out, depending on the commodity traded and other economic factors, including income. For example, wealthy markets in Europe are unlikely to conduct trade in raw resources, but are heavy traders of advanced manufacturing products like precision instruments. Middle Eastern and African markets are major energy traders. Latin American countries supply large amounts of agricultural products to U.S. metropolitan areas and tend to import American machinery, electronics, and other manufactured goods. These large international connections will require continued monitoring over time, as metropolitan areas look to boost exports and strengthen their global fluency.[27]

C. Every region of the country relies on at least one major network hub to move large volumes of goods along different corridors domestically and internationally.

The country's trade network centers on a small group of metropolitan areas, all of which act as production and consumption hubs or warehousing and distribution specialists (or both). These metropolitan nodes are the most heavily involved in the largest trade corridors assessed in the previous finding, meaning that the operational efficiency of their freight infrastructure should be a national priority. These nodes merit focused planning and investment strategies to best facilitate trade along major corridors.

By analyzing "centrality"—a measure of how many places a region trades with and the value of those trade corridors—a clear hierarchy emerges among many U.S. regions.[28] There is a select group of three metropolitan areas that easily surpass all other places: Chicago, New York, and Los Angeles. Below them are the two biggest metropolitan areas in Texas—Houston and Dallas—followed by ten more of the 100 largest metropolitan areas. Overall, Figure 3 shows that the highest-centrality metropolitan areas can be found across the country, including a key trading and distribution hub within every Census Division.[29] In much the same way, Table 5 illustrates how the most centralized regions are almost invariably one of the largest metropolitan areas.

Figure 3. U.S. Metropolitan Areas in the Contiguous 48 States, Goods Trade Centrality, 2010



Note: Higher relative centrality percentages are assigned to metro areas with a large number of connections and trade volumes relative to the most central trader in the nation (Chicago).
Source: Brookings analysis of EDR and Census data

Table 5. Top 25 Most Centralized Trading Regions, 2010 *($ millions)*

Rank	U.S. Region	Census Division	Total Trade Volume	Relative Centrality
1	Chicago-Joliet-Naperville, IL-IN-WI	East North Central	$657,692.9	100.0%
2	New York-Northern New Jersey-Long Island, NY-NJ-PA	Middle Atlantic	$719,962.4	97.8%
3	Los Angeles-Long Beach-Santa Ana, CA	Pacific	$699,322.4	97.7%
4	Dallas-Fort Worth-Arlington, TX	West South Central	$420,461.2	91.5%
5	Houston-Sugar Land-Baytown, TX	West South Central	$511,898.1	90.7%
6	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	Middle Atlantic	$349,964.2	88.2%
7	Riverside-San Bernardino-Ontario, CA	Pacific	$163,102.6	87.1%
8	San Diego-Carlsbad-San Marcos, CA	Pacific	$146,965.5	86.4%
9	Phoenix-Mesa-Glendale, AZ	Mountain	$200,995.8	86.0%
10	Atlanta-Sandy Springs-Marietta, GA	South Atlantic	$336,996.4	85.8%
11	Detroit-Warren-Livonia, MI	East North Central	$288,718.3	84.9%
12	St. Louis, MO-IL	West North Central	$198,148.1	84.4%
13	Minneapolis-St. Paul-Bloomington, MN-WI	West North Central	$218,902.6	84.1%
14	Milwaukee-Waukesha-West Allis, WI	East North Central	$131,230.8	83.9%
15	Miami-Fort Lauderdale-Pompano Beach, FL	South Atlantic	$169,651.1	83.8%
16	Rest of Texas	West South Central	$268,416.9	83.6%
17	Oxnard-Thousand Oaks-Ventura, CA	Pacific	$77,317.3	83.6%
18	San Francisco-Oakland-Fremont, CA	Pacific	$243,566.7	82.5%
19	Rest of Wisconsin	East North Central	$123,912.9	82.1%
20	Washington-Arlington-Alexandria, DC-VA-MD-WV	South Atlantic	$169,412.3	82.0%
21	Rest of Illinois	East North Central	$146,732.0	81.1%
22	Rest of Ohio	East North Central	$229,190.4	80.9%
23	Boston-Cambridge-Quincy, MA-NH	New England	$236,595.9	80.6%
24	Memphis, TN-MS-AR	East South Central	$184,309.6	80.6%
25	Seattle-Tacoma-Bellevue, WA	Pacific	$185,324.3	80.5%

Source: Brookings analysis of EDR and Census data

The country's most centralized trade region is Chicago, which benefits from a highly diversified economy and close proximity to several large Midwestern metropolitan areas and Canada. As one of the country's premier traders in a variety of goods, Chicago powers multiple domestic and global supply chains. It is the country's principal trader in machinery and metals, helping areas such as Detroit and Pittsburgh forge strong ties with other top markets like China and Canada. It also drives the movement of mixed freight and other general consumer products along multiple trade corridors, particularly with neighboring metropolitan areas like Milwaukee, Rockford, and Minneapolis.

Geographic proximity plays an even bigger role for Los Angeles, the third most centralized trade region. As the central hub in Southern California, Los Angeles is able to leverage the largest Western Hemisphere port complex and its various industrial specialties to funnel huge amounts of goods around the country and world. The surrounding metropolitan areas—Riverside, San Diego, and Oxnard—all benefit from this direct connection, with each metro area exhibiting higher-than-expected centrality scores due to their proximity to Los Angeles. Not only does this allow residents and businesses in these peripheral areas to access Los Angeles' extensive global trade connections, but it also gives the rest of the country quicker access to Southern California's products, such as those from San Diego's world-class electronics industry. Effectively, these regions' centrality is boosted by their ability to use Los Angeles as a pass-through point. This is especially noticeable in Riverside, which is now one of the country's premier logistics clusters.[30]

Other metropolitan areas attain a more central position within the national trade network based on their production or logistics specialties in particular commodities. This is the case for high-ranking St. Louis. While the bi-state metropolitan area benefits from trading nearly all goods at relatively large amounts—reflecting its classic role as a mid-American logistics depot—large tradable industries related to pharmaceuticals, metals, and scrap materials are the major drivers of its high centrality score.

These centralized metropolitan actors also demonstrate how supply chains do more than just connect major producers and consumers. Rather, logistics hubs serving as intermediary points—for warehousing, redistribution, and other supply chain activities—also help facilitate goods movement.

Phoenix and Tucson highlight this phenomenon quite well. These areas represent the two largest metropolitan economies in Arizona by far, responsible for 82 percent of statewide population and 86 percent of statewide economic output.[31] Considering their shared desert climate, both are also major net consumers of agricultural products from outside Arizona. However, while Phoenix purchases most of its agriculture from outside the state, particularly from producers in California's fertile Central Valley and Los Angeles distributors, Tucson trades 62 percent of its agriculture products with Phoenix. These two interrelated trading relationships reinforce the unique roles of each market: Phoenix depends on ready access to out-of-state suppliers, while Tucson uses quality transportation to access Phoenix's wider distribution network.

Such a highly centralized network design means logistics or production problems in one of these large metropolitan areas—like a major highway backup or a shutdown at a manufacturing plant—can affect trade markets across the country. That makes transportation reliability and alternative routing in and out of these centralized markets a critical component of national and local freight strategies.

D. Metropolitan areas tend to trade more goods with each other when they are located close together, employ a sizable number of logistics workers, and house large populations.

As the previous findings have shown, metropolitan areas operate at the center of many different trade networks, exchanging large volumes of goods with a variety of domestic and international regions. However, their most significant connections often depend on a smaller, distinct group of trading partners, which can place tremendous pressure on the physical infrastructure in certain areas. For federal, state, and local policymakers, understanding what factors cause trade networks to concentrate and centralize can serve as a crucial guidepost for future freight plans, export strategies, and infrastructure investments.

First, areas in geographical proximity usually exchange more goods with one another. Controlling for all other factors, each additional 100 miles separating two regions reduces expected trade volumes by 3.2 percent. Distance's negative effect also carries across all types of commodities being moved. Such a consistent effect on goods trade confirms that there is an "economic gravity" to trading relationships, where regions in greater proximity tend to trade more with one another than similar peers spread across the country.[32]

Domestically, several metropolitan areas demonstrate these trade patterns. Portland, OR, for instance, trades over 37 percent of its total goods with peers in Oregon and Washington state; its trade with Salem, OR and Eugene, OR—both relatively small economies—even exceeds the metro area's trade with Chicago and San Francisco. Likewise, Indianapolis exchanges over 41 percent of its goods with trade partners in nearby Indiana, Illinois, and Ohio. Allentown, PA trades over 30 percent of its goods with just New York and Philadelphia.

Second, when controlling for all other factors, every additional 10,000 logistics workers (e.g., in ports, warehouses, and other freight facilities) will increase the expected trade between two regions by over 12 percent.[33] This can lead to a huge effect in metropolitan areas given the widespread nature of the nation's logistics workforce.[34] Firm-related logistics hubs like Memphis (53,000 logistics workers) and Louisville (37,600), plus major port and economic hubs like New York (131,020) and Miami (48,040), all boast high levels of logistics employment in this respect (see Box C).[35]

Metropolitan areas with higher logistics employment also tend to have larger international trade corridors. Although the relative importance of these corridors varies across different commodities—with AI products like electronics and transportation equipment frequently playing a lead role—the effects of having more logistics workers are almost always significant and positive. For example, San Francisco, Seattle, and Riverside all rank among the country's 20 largest logistics employers, with nearly 120,000 of these workers combined; they are also among the nation's largest traders with China, Japan, and South Korea, exporting and importing over $39 billion in goods with these three countries alone.

These results should not be misinterpreted to suggest that simply hiring more logistics workers in a region will lead to increased trade with all other regions. Rather, they confirm the general theory that logistics hubs tend to play a more active role in the national trade network.[36] Likewise, industrial growth that leads to greater goods production and consumption is also likely to command more logistics employment. In either case, every region should monitor its industrial economy and logistics workforce to determine if growing trade will lead to increased stress on its freight infrastructure.

Box C. The Importance of Logistics Hubs in Metropolitan Trade Networks

Although physical distance and logistics employment each have a significant impact on trade, combining their effects with the presence of local trading industries helps demonstrate the vital role played by logistics hubs within specific regions. The operational efficiencies offered by these hubs benefit metropolitan areas, not only by allowing them to reduce the costs of moving goods in the short run, but by improving their economic competiveness in the long run.[37] Several metropolitan areas help create such efficiencies by serving as key gateways in larger trade networks, moving goods in and out of different regions and relying on infrastructure facilities that require targeted investments over time.[38]

Among the country's largest freight hubs, Atlanta exemplifies these patterns by moving large amounts of freight throughout the Southeast. Since its inception as a railroad junction almost two centuries ago, Atlanta has emerged as a major manufacturing and commercial crossroads, with its highways and other infrastructure assets serving as an essential foundation for area businesses.[39] By strengthening its connections with Savannah, Jacksonville, Miami, and other regional partners, Atlanta has been able to steadily increase the volume of goods it moves and boost its business growth over time.[40] In addition to Georgia's statewide freight plan, public and private efforts spurred by Metro Atlanta's Supply Leadership Council have also aided in these efforts.[41]

Today, metro Atlanta is home to over 66,000 logistics workers, supporting the trade of more than $337 billion in domestic and international goods. Based on these advantages, Atlanta ranks as one of the top ten trading partners for 61 of the 66 metropolitan and non-metropolitan areas throughout the Southeast. At the same time, six of Atlanta's top ten trading partners are located in the Southeast, even though it maintains strong connections with New York, Chicago, and Los Angeles.

Several other metropolitan areas serve as similar regional logistics hubs, including Seattle. With goods-related industries supporting over 700,000 jobs in the Puget Sound region alone, Seattle represents a key domestic and international trade hub for products central to the region's economic growth.[42] Along with the Port of Seattle and the Port of Tacoma, the metropolitan area's highways, rail lines, and air routes handle increased levels of traffic each year, heightening the need for public and private partners to guide future investments. Much like Atlanta, Seattle benefits from an advisory board and regional multimodal freight strategy to facilitate these movements, but has also undertaken initiatives like the FAST Corridor Partnership, which identifies chokepoints and accelerates project completion.[43]

In turn, Seattle serves as both the largest trader and major transfer point in the Pacific Northwest, leading a local $185 billion yearly trade market. From electronics to transportation equipment, Portland represents Seattle's largest connection ($16.8 billion) by far. However, smaller metropolitan areas such as Mount Vernon and Bellingham also trade extensively with Seattle—a combined $8.2 billion annually—which exceeds the totals Seattle exchanged with Phoenix ($5.2 billion), New York ($3.5 billion), and Chicago ($2.9 billion). Non-metropolitan parts of Washington and Oregon also stand out in this respect, in addition to smaller outlets like Olympia, Yakima, Salem, and Spokane. For these other Pacific Northwest regions, Seattle is a key connector to the global marketplace.

Third, when controlling for all other variables, an additional one million residents increases expected trade volumes by over 1.5 percent. Since the model controls for growth in industrial production and consumption, this is a clear indicator of how increasing household demand can affect trade levels. While the population-related effect may be minimal in smaller markets, the effect can add up in some of the country's largest. In total, 17 metropolitan areas and two non-metropolitan areas house at least 3 million residents. These locations—ranging from New York and Los Angeles to Miami and Minneapolis—can expect sizable trade boosts based on their size alone, and help explain why many of the country's largest trade corridors concentrate between some of the most populated metropolitan areas.

While these three factors play a significant role in determining trade volumes at the metropolitan level, there are many other issues for policymakers to consider as they develop freight policies and plans. The industrial composition of two markets—the supply and demand of firms in each location—is a classic theoretical determinant of trading relationships (see Box D). As past research shows, areas that house facilities related to the same firm or parent company can often realize increased "intrafirm trade," generating additional goods movement between local economies.[44]

As one would expect, U.S. regions also tend to trade more with world regions that boast higher average wealth. Examining both imports and exports, every additional $1,000 in GDP per capita income within international regions will increase expected trade by 0.9 percent with that same region. On the export side, this confirms the notion that world regions will be able to purchase more expensive American products if they become wealthier. However, the existence of the same trend on the import side confirms that higher average wealth actually increases bilateral trade. Indeed, higher per capita incomes can often have enormous effects on intra-industry trade between different countries, even when controlling for other relevant costs.[45]

Box D. How Industrial Production and Consumption Affect Regional Trade

Whether a region specializes in energy and agriculture or machinery and electronics, their farms, factories, and other businesses drive the production and consumption of goods, causing a constant stream of freight to flow beyond their borders.[46] The unique size and concentration of these industries, in turn, helps determine why some areas move certain types of goods—and engage in specific trading relationships—with other regions.

To better understand how theory translates into actual trade between domestic regions, this report uses a fixed-effects panel regression model to isolate the effects of industrial production and consumption on trade corridors between two regions. The model finds production and consumption both significantly affect trade levels, but the results are not consistent across specific commodities (Appendix B includes the model's full results).

On the production side, metropolitan areas with similar goods-producing industries tend to trade more with each other. When controlling for all other factors, origin metropolitan areas send an additional 6.3 percent of goods to other regions for every $1 billion in related industrial output. At the same time, destination regions see a 3.1 percent increase in inflows when their industries grow by $1 billion in output. In this way, metropolitan areas frequently rely on common, intra-industry networks when trading goods with one another.

For example, Pittsburgh has long been a national leader in steel-related manufacturing and trades nearly one-quarter of its metals with five regions featuring similarly large metal-producing industries: Cincinnati, Chicago, non-metropolitan Ohio, Youngstown, and Cleveland. Likewise, as a major petrochemical hub, New Orleans conducts nearly 45 percent of its chemicals trade with other Gulf Coast petrochemical centers in Houston, Baton Rouge, and non-metropolitan Louisiana.

However, not every commodity demonstrates the same level of co-production effects. For instance, wood products, tools, and precision instruments do not always experience a boost in trade when destination regions contain industries producing similar commodities.

On the consumption side, many metropolitan areas also deviate from any definitive pattern in their goods trade. For example, origin metropolitan areas with greater industrial consumption may experience reduced external trade in the related commodities—meaning more trade occurs within the metropolitan area. For destination markets, the aggregate effects of industrial consumption can also be statistically insignificant or close to zero. Still, many areas with greater industrial consumption do see higher levels of trade, especially in commodities such as electronics, tools, and precision instruments.

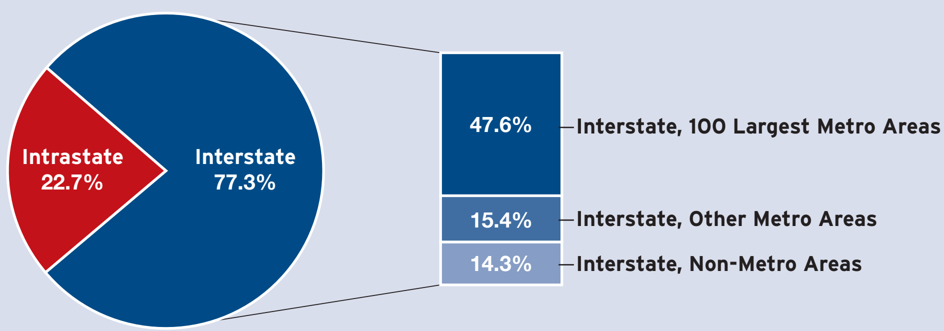
E. With over 77 percent of the nation's freight moving between different states, the United States must establish a more coordinated freight strategy across all levels of the public and private sectors.

To drive their long-term economic growth, metropolitan areas depend on trade networks that span across multiple geographies, frequently engaging in relationships that extend into other states and ripple throughout the country's larger freight system. By examining the "interstate" nature of these networks, metropolitan leaders not only gain a greater sense of how their industries connect to areas well beyond their borders, but federal policymakers can begin to uncover those corridors that support goods exchange between far-flung markets—a key consideration when mapping national freight corridors and hubs of national commerce.

In total, interstate trade amounts to $15.6 trillion annually and accounts for over 77.3 percent of the country's goods trade, signaling the importance of distant markets to drive local goods production and consumption.

Not surprisingly, as the centers of U.S. goods trade, the nation's 100 largest metropolitan areas rely extensively on interstate networks.[47] These metropolitan areas exchange $9.6 trillion in goods across state lines, more than three-quarters of which is bound for areas far from their home markets. In fact, this expansive interstate movement is so large that it represents almost half (47.6 percent) of all U.S. goods trade (see Figure 4).

Figure 4. Intrastate and Interstate Shares of National Goods Trade, 2010



Source: Brookings analysis of EDR and Census data

In particular, the ten largest metropolitan areas move 22 percent of all goods nationally and often play an outsized role in supporting this extensive interstate network.[48] For example, New York (94.8 percent), Chicago (93.2), Boston (91.9), and Philadelphia (90.0) are among the nation's leaders in their share of interstate trade, frequently engaging with trade partners beyond their immediate state borders.

Some commodities tend to move more across state and national borders than others. AI products are the most notable in this respect, with precision instruments (90.9 percent), electronics (86.9), transportation equipment (84.7), chemicals/plastics (81.7), machinery (78.1), and pharmaceuticals (77.5) all having above-average interstate shares. As a result, metropolitan areas that specialize in trading these AI goods, like Boston and Minneapolis, rely on long supply chains and access to distant markets to grow their industries.[49]

Interstate trade, as such, plays an important role throughout the country's freight network, with several metropolitan areas contributing immensely to this movement (shown in Table 6). For example, 13 of the 100 largest metropolitan areas traded over 90 percent of their goods across state lines, including Las Vegas (97.5 percent), Memphis (94.0), Baltimore (93.5), and Providence (93.4). Since all four of these areas are located near—or even extend across—state borders, their geographic location may partially explain their interstate connectivity. However, there are likely several other factors at play as well; Albuquerque, Little Rock, and Phoenix all fall within the top quintile of interstate traders, but are located far from their state borders.

The ten metropolitan areas that engage in interstate trade the least are located in either California or Florida. California boasts the world's ninth largest economy and is a natural origin and destination for many of its own local goods, as evident in Stockton (19.7 percent), Modesto (24.2), and Bakersfield (39.9).[50] Tucson (55.1 percent), San Antonio (55.9), and Colorado Springs (57.8) are also relatively small interstate traders and have large metro areas to trade with in their home state.

Table 6. Top and Bottom Interstate Trade Shares, 100 Largest Metropolitan Areas, 2010

Metropolitan Area	Total Trade (*$ mil*)	Interstate Trade (*$ mil*)	Interstate Share
Top 10			
Las Vegas-Paradise, NV	$55,471.1	$54,058.3	97.5%
New York-Northern New Jersey-Long Island, NY-NJ-PA	$719,962.4	$682,851.0	94.8%
Memphis, TN-MS-AR	$184,309.6	$173,265.5	94.0%
Baltimore-Towson, MD	$162,106.2	$151,603.0	93.5%
Providence-New Bedford-Fall River, RI-MA	$90,980.1	$85,011.5	93.4%
Chicago-Joliet-Naperville, IL-IN-WI	$657,692.9	$613,051.0	93.2%
Boise City-Nampa, ID	$28,342.7	$26,088.8	92.0%
Boston-Cambridge-Quincy, MA-NH	$236,595.9	$217,416.4	91.9%
Albuquerque, NM	$33,908.9	$30,926.4	91.2%
Kansas City, MO-KS	$162,025.6	$147,296.2	90.9%
Bottom 10			
Riverside-San Bernardino-Ontario, CA	$163,102.6	$89,248.3	54.7%
North Port-Bradenton-Sarasota, FL	$29,860.5	$14,257.3	47.7%
Sacramento--Arden-Arcade--Roseville, CA	$107,144.7	$50,519.6	47.2%
Cape Coral-Fort Myers, FL	$16,419.9	$7,732.1	47.1%
Fresno, CA	$52,241.0	$23,373.4	44.7%
Oxnard-Thousand Oaks-Ventura, CA	$77,317.3	$34,526.3	44.7%
Lakeland-Winter Haven, FL	$40,565.5	$17,434.7	43.0%
Bakersfield-Delano, CA	$41,078.9	$16,410.5	39.9%
Modesto, CA	$58,840.6	$14,225.2	24.2%
Stockton, CA	$72,894.2	$14,330.5	19.7%

Source: Brookings analysis of EDR and Census data

Policy Implications

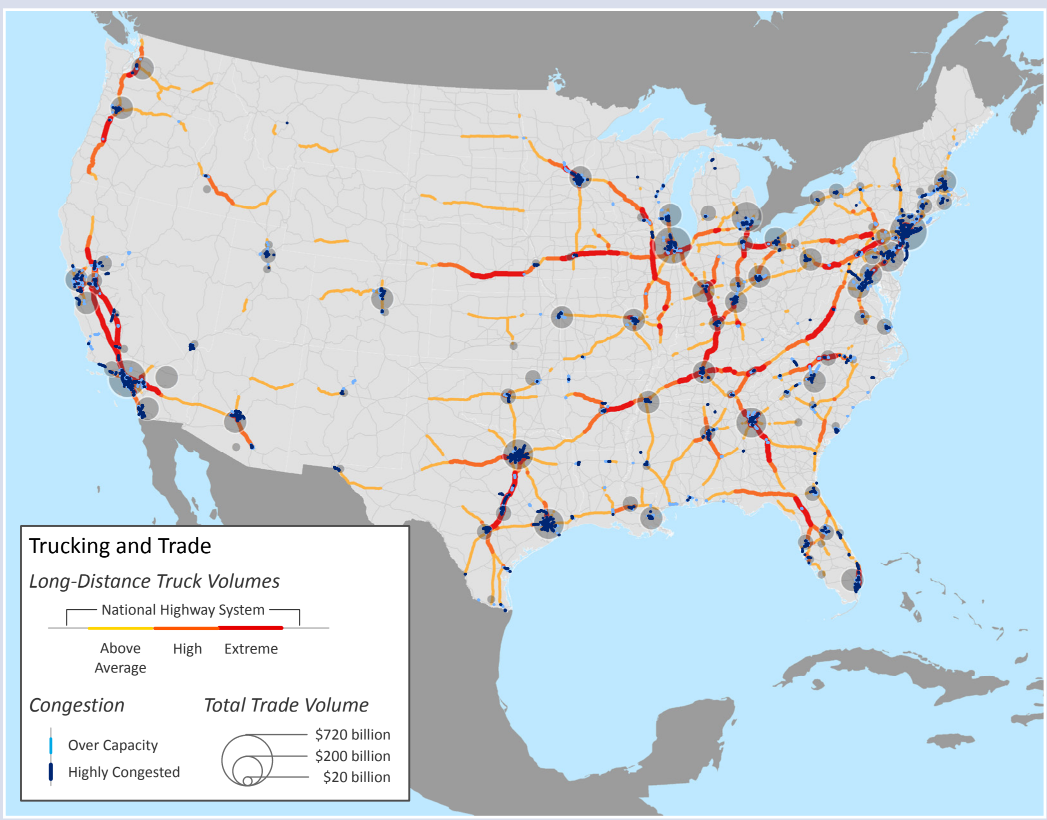
Goods trade helps metropolitan areas expand their economies in many different ways: It opens up new markets, encourages innovation, and spurs exports.[51] Over time, it allows these areas to develop unique industrial specialties and forge strong partnerships with firms throughout the world. However, metropolitan areas do not always understand their position in larger trade networks and frequently rely on broad national measures—or no clear measures at all—to prioritize their freight investments.

At the same time, the ongoing disconnect in plans and programs among national, state, and local stakeholders has made it difficult to promote greater intermetropolitan trade.[52] Across both the public and private sectors, the lack of a well-defined, networked approach to freight infrastructure continues to hold back needed projects and hinder long-term economic growth.

This report aims to address the information gap by helping metropolitan areas better understand their place in the national trade network and prioritize freight infrastructure improvements. In particular, by revealing clear hierarchies in how metropolitan, non-metropolitan, and international regions trade with one another, the report highlights the enormous value concentrated in a discrete number of corridors and demonstrates how the entire country can benefit from more targeted future investments in these places.

This is especially apparent when mapping the country's trade flows. Metropolitan areas like New York, Chicago, Los Angeles, Atlanta, and Dallas operate as trading depots for the entire country, consolidating goods movement in every direction and within their surrounding regions. Similarly, other metropolitan areas anchor specialty networks in specific commodities—like petrochemicals in Houston and New Orleans, or transportation equipment in Seattle and Detroit. This means that goods trade for all markets tends to use the same major trade corridors. Looking at the map of truck traffic in 2007—based on the most recent national dataset and the transportation mode responsible for two-thirds of all traded value—there are clear concentrations within the largest metropolitan areas and along the cross-country corridors connecting them (see red and orange lines in Figure 5).[53]

Figure 5. Long Distance Truck Loads and Highway Congestion, 2007; Regional Trade Volume, 2010



Source: Brookings analysis of Freight Analysis Framework 3.4 and EDR data

This information sends a clear signal: Metro areas matter when it comes to trade. However, this concentration of activity comes at a distinct cost to firms and consumers.

The largest metropolitan areas are more than just trading hubs—they are also the country's busiest sites of aggregate commerce. As a result, there is immense pressure placed on existing infrastructure. The most congested highways in Figure 5 essentially exist only within the largest trade metro areas, but that congestion also tends to cover large swaths of their land area. Trucking firms specifically plan operations to avoid the worst congestion along their routes, but demand for urban pickups and deliveries create increased costs via unreliability and force shippers to grapple with general congestion.[54] By one estimate, the Texas Transportation Institute found truck congestion alone cost the country $27 billion in wasted time.[55] Freight rail firms encounter extreme congestion in their primary depot markets, most notably Chicago.[56] Ports and airports are often situated within classic urban cores, putting them at the mercy of rush hour and other congested traffic patterns. The end result of these inefficiencies is higher costs to society, which may be passed along to freight customers or include general societal costs like greater pollution and reduced safety.[57]

Moving forward, firms and metropolitan economies will need to adopt freight policies that better reflect the functionality of the nation's trade networks. These policies should specifically address market failures related to the movement of goods—particularly the effects of local traffic congestion on trade routes. In doing so, national and local leaders alike must flip their traditional approaches to trade and transportation.

Nationally, freight policy should be economically-based and location-specific.

With over 77 percent of all goods crossing state or international borders, federal policymakers can facilitate this movement by investing in those infrastructure assets vital to efficient trade and transportation between individual markets. Critically, it is the federal government's responsibility to reasonably protect local congestion from interfering with interstate commerce. For example, while Des Moines, or even the state of Iowa, will need to examine market-specific freight concerns in greater depth, it is essential that federal policymakers consider how transportation problems in distant hubs like Los Angeles and New York can impact Iowa's industries. Developing a comprehensive national freight strategy across multiple modes and markets is one step that can help prioritize investments.

Adopting such a strategy will require reforming current policy. Antiquated formulas still dominate the majority of the Federal Highway Administration's (FHWA) annual spending, spreading resources too evenly across the country and without a direction to prioritize highway maintenance.[58] As Matthew Kahn and David Levinson detail in a 2011 paper, the country should free up funding by shifting to a fix-it-first policy that prioritizes maintenance—now that the national highway system connects every corner of the country—and a rigorous performance-based system to approve new capacity. This transition will ensure the country gets the greatest return from increasingly constrained budgets.[59]

Reforms are required for other modes, too. Freight projects received significant funding under the Transportation Investment Generating Economic Recovery (TIGER) program, but the specific economic rationale for selections is still the subject of debate.[60] Likewise, the latest surface transportation law—the Moving Ahead for Progress in the 21st Century Act (MAP-21)—now permits investment at port-related intermodal connections, but this should be expanded to any intermodal facility or multimodal intersection where other transportation infrastructure or general property development slows down freight movements.[61] Legacy aviation, port, and security programs that distribute resources across the country to facilities of all size—like the Airport Improvement Program—should be reformed to better reflect current or projected freight loads.[62] Overall, groups like the National Freight Advisory Committee (NFAC) provide a blueprint for reforming overall freight policy, but more work remains to stitch specific recommendations into a comprehensive policy.[63]

Crafting such a national strategy will also require the use of cutting-edge analytics. This report demonstrates how non-transportation-based criteria can determine where freight investment is most needed. Over time, federal analysts should track specific freight patterns, including which metro areas act as national and regional trading centers and where logistics employment may be shifting due to firm decisions and other shipping patterns. Similar attention should be given to regional economic indicators, whether aggregate population growth or specific industrial patterns. Likewise, new technologies like 3-D printing, increased concerns over global commodity availability, a rapidly restructuring energy economy, and constantly evolving attitudes toward free and protected trade can all dramatically change trade network behavior.[64] Finally, the country requires a supply chain dataset that specifically tracks how industries trade with one another across different regions, and the specific routes transportation modes use to connect those industries. Using existing models like the Canadian freight fluidity system and Gateways and Corridors Initiative as a starting point, a supply chain dataset will identify specific pinchpoints in the national network and facilitate designation of national priority corridors.[65]

A national freight strategy should be accompanied by a targeted investment program. Most importantly, dedicated funding must be found to invest in these critical metropolitan hubs and their associated freight corridors. There are many possible alternatives—for example, freed-up funding from old FHWA formulas—but funding must be immune to annual appropriations battles.[66] The funding should also be delivered to places rather than specific projects. Freight pinchpoints often encompass a multitude of problematic transportation sites, and even a focus on megaprojects may not be enough to solve a region's problems. This is a clear limitation within the current Projects of National and Regional Significance program, although the targeting approach of that program is to be applauded.[67] The preferred alternative is something like Chicago's CREATE project suite, a public-private partnership to construct 70 projects across the metropolitan area that will specifically address rail and automobile freight congestion.[68]

It is critical that the Department of Commerce and related Congressional committees participate in the process of building this new strategy. Freight has as much to do with industry as it does transportation. Considering that the domestic trade market dwarfs the international one, now is the perfect time for Commerce leaders to provide their expertise—especially around supply chains—as the country designs new freight approaches. The Department of Commerce's Advisory Committee on Supply Chain Competitiveness has started to build a policy framework to better support the nation's freight network, but executive and legislative leaders will be required to implement their recommendations.[69]

Locally, metro area leaders need to think broadly and network for shared transportation solutions.

For the first time, the sub-national trade data presented here allows metropolitan leaders to understand how their industrial production and consumption demands create physical relationships with their domestic and international peers. Since every metro area is distinct, their trade networks will be unique. However, the one common thread uniting regional trade networks is their reliance on transportation infrastructure far beyond their local regions.

In order to grow local trade networks, leaders must consider transportation policies from a broader perspective, which will require stronger collaboration with their state partners. Considering their economic heft (and planning opportunities within federal policy frameworks), gaining state support for metropolitan priorities is one potent method to improve freight transportation within a specific place.[70] Miami and the Florida state government provide an excellent example. Recognizing the importance of logistics to the state economy—both in job creation and for growing tourism and manufacturing—the state increased investment in statewide freight infrastructure.[71] Similarly, Miami recognized the potential to leverage its position as a major gateway to Latin America to further boost its logistics business. Combined, the region and state collaboratively invested in three major projects around Port Miami to achieve their shared objectives: a deep dredge, a new harbor tunnel, and an improved intermodal facility.[72] Their combined expertise also enabled each project to be funded and financed in innovative ways, including the most expensive availability payment structure at the time in the country's history.[73] It is incumbent on local and state leaders to better understand the importance of specific metropolitan economies to their shared success, and to craft policies and investments that support critical trading hubs.

Metro areas can also begin to forge partnerships with local industries and their peers in other states. Locally, metropolitan leaders should establish durable networks with their private sector peers to prioritize and even share costs on those transportation investments that best reflect trade's current geographic directionality and support potential growth areas. For example, North Carolina helped construct a freight rail spur to support a new Siemens gas turbine plant near Charlotte.[74] While this public investment attracted new jobs to the region, future agreements should attract direct private investment in freight infrastructure.

Neighboring metro areas, especially those involved in complementary domestic and global value chains, can enter into agreements that mutually benefit each region. The major ports in Tampa, Houston, and Mobile formed such an agreement in 2010, jointly marketing to shippers to make use of their ports based on unique commodity specialties and different distribution networks across the entire Gulf Coast region.[75] There is great potential for metropolitan areas to explore new partnership models, especially as global infrastructure dynamics confirm the need for more innovative combinations of public and private financing.[76]

Mutual agreements could be equally beneficial to states. While the share of interstate trade demonstrates a clear need for federal involvement, there is no reason for states to wait as federal policymakers redefine future national strategies. This report's dataset enables states to assess their common trading partners, in turn helping to determine where trade creates links between productive economies and global value chains. As MAP-21 pushes states to craft statewide freight plans, they should actively consider formal agreements to make the best use of federal and state resources.

While these external approaches are important, metropolitan leaders should not forget those elements of their local freight networks they do control. Land use is easily one of the most important elements in this regard, and has a clear connection to the first- and last-mile concerns that take place within local economies.[77] According to recent research by Laetitia Dablanc and Anne Goodchild, the explosive growth in warehouse and distribution centers has been acutely felt in the largest metropolitan areas, leading to higher truck miles, increased overall congestion, and higher emissions.[78] Compounding these effects are legacy infrastructure routes, in particular downtown freight arteries that now compete for space with modern service industries.[79]

All regions should tie logistics-based land use decisions to industrial patterns, creating alignment in which each sector helps builds the other while minimizing external impacts. This is the case of the Fulton Industrial Boulevard in Atlanta and Rancho Dominguez in Los Angeles.[80] For less intensive logistics hubs, related policies like promoting off-hour deliveries can promote land uses more averse to freight's external costs.[81] This is the case for innovation districts, which rely on advanced industries and densely built environments to prosper.[82] This kind of industrially aligned land use policy can create an environment that best supports intermetropolitan trade, supporting the long-term growth of both goods-producing and goods-consuming industries.

Box E. Detroit's Trade Networks and Reliance on Transportation Infrastructure

Metropolitan Detroit exemplifies the importance of goods trade to long-term transportation policy efforts, whether judged by its local industrial specialties, inflows from other markets, or its role as a national logistics hub.

Detroit's traded economy thrives on transportation equipment manufacturing. Canada is the metropolitan area's single largest trading partner, with $11.2 billion worth of goods moved across its border every year. In an effort to further enhance their combined manufacturing strength and reduce their related transportation costs, Detroit and its Canadian peers established automotive-based free trade, beginning in 1965 under the Automotive Products Agreement.[83] While local border crossing facilities have helped bolster this Canadian partnership, metro Detroit does not enjoy the same benefit with Mexico, its second-largest trading partner in transportation equipment. Instead, Detroit must rely on national investments in U.S.-Mexican border infrastructure and other domestic freight corridors to efficiently move goods with its southern North America Free Trade Agreement (NAFTA) neighbor.

Beyond Detroit's focus (and trade surplus) in transportation equipment, its economy depends on critical commodities supplied by other markets. Detroit requires a significant amount of chemicals and plastics to power its manufacturing base, which require heavy inflows from congested metropolitan areas like New York and Houston. At the same time, Detroit's households require a constant stream of food and clothing to meet their daily needs, leading to major agricultural inflows from depots like Chicago and imports of Asian textiles shipped through Los Angeles' ports. These deficits, in turn, pinpoint why Detroit has an interest in ensuring that freight moves efficiently in other metro areas across the country.

Finally, Detroit operates one of the busiest border crossings in the world, which not only provides employment for more than 32,000 logistics workers locally but also greatly facilitates international trade for metropolitan areas in the United States, Canada, and elsewhere.[84] Canada has already established a national freight strategy that prioritizes place-based economic development.[85] State and local leaders in Michigan would benefit from adopting a similar approach by better targeting infrastructure investment to boost capacity and operational efficiency. Increased federal support can further build upon these regional efforts, strengthening Detroit's position as a major logistics hub for years to come.[86]

Conclusion

Goods trade stitches the global economy together, connecting metropolitan areas in extensive value chains, empowering industries to develop production specialties, and promoting widespread growth. The United States is a key cog in this global system, both as a top international trader and domestic powerhouse, but policymakers must continue exploring strategies that better support and prioritize infrastructure investments within the nation's freight system.

Significantly, the nation depends on particular places to drive this economic activity, with the largest metropolitan areas playing the most prominent role. Trade corridors connected to these metropolitan areas are responsible for moving 80 percent of the nation's goods, but also for transporting the most valuable advanced industrial products, critical to long-term innovation and production. In addition, as the nation's most significant logistics hubs and population centers, these metropolitan areas depend on an efficient, well-connected infrastructure network to move goods throughout the country.

In this way, federal, state, and local policymakers need to consider a range of freight plans and investments that orient around these essential trade nodes. In the past, the federal government has delivered geographically equitable transportation investments throughout the interstate highway system, but it is now time for leaders across the public and private sectors to coordinate their efforts based on regional, multimodal priorities from the ground up. ■

Appendix A. Study Design

Goods Trade Database

This report uses a unique database measuring goods traded among U.S. metropolitan areas, nonmetropolitan regions, and international geographies. We used the data foundation and design scheme of the publicly available Freight Analysis Framework (FAF), Version 3.2. The U.S. Federal Highway Administration (FHWA) constructed the database with the help of the Oak Ridge National Laboratory (ORNL).[i] The database provides a comprehensive view of freight movement to, from, and within the United States. Originally based on calendar year 2007, Version 3.2 has been provisionally updated to estimate 2010 total freight volumes, or flows, by annual tonnage, value, and ton-mileage.

FAF estimates and assigns these flows through a matrix based on the shipment origin (O), shipment destination (D), commodity being transported (C), and mode used (M). To build this matrix and model freight movement, FAF draws from multiple data sources, but is principally derived from the Commodity Flow Survey (CFS), which is conducted every five years through a partnership between the U.S. Census Bureau and the Bureau of Transportation Statistics (BTS) as part of the Economic Census.[ii] The CFS is a shipper-based survey that tracks the number of tons and dollar value of goods transported annually across all modes between different regions of the United States. However, because the CFS excludes imports and collects limited data for several freight-related industries, FAF uses a multi-step approach and additional data sources to estimate these "out-of-scope" flows.

In total, the FAF matrix covers 131 geographic regions, 43 commodities, and seven transportation modes. Geographically, FAF's origin-to-destination (O-D) movements span 123 domestic regions and eight world regions, including 74 state-specific U.S. metropolitan areas, 33 state remainders, and 16 whole states. Metropolitan areas in FAF do not cross state lines, meaning metropolitan statistical areas are frequently divided into different parts depending on the states located within their respective bounds. Kansas City, for instance, is divided between two states (Missouri and Kansas). In addition, FAF does not follow a single metropolitan geographic definition, and instead uses both Combined Statistical Area (CSA) and Core Based Statistical Area (CBSA) definitions. For international flows, Canada, Mexico, and six groups of multiple other countries are included and classified in the same way as statistical regions by the United Nations.[iii] Despite FAF's extensive spatial scope, it often lacks granularity for specific metro areas and even for most country-level origins and destinations.

FAF reports commodities at the Standard Classification of Transported Goods (SCTG) system's two-digit level. Collectively, there are 43 different two-digit SCTG commodity codes, ranging from live animals and fish (SCTG-01) to logs (SCTG-25) and mixed freight (SCTG-43). FAF relies on a variety of data sources to estimate these commodity flows because many goods, including agricultural and petroleum products, are concentrated in industries that fall outside the scope of the CFS.

By partnering with Economic Development Research Group (EDR), we were able to modify FAF to create a new database that identifies commodity flows with greater domestic and international precision. In addition to industry data from IMPLAN and Moody's Analytics, trade data from the World Institute for Strategic Economic Research (WISER) were particularly important to help model freight movement in terms of local economic activity. While carrying out this work, we also addressed several gaps and discrepancies inherent in FAF.

With an interest in showing domestic and international freight flows in, out, and among all of the country's metropolitan areas, we worked with EDR to estimate freight movement across combined statistical areas (CBSAs). Because FAF zones and CBSAs have overlapping spatial coverage at the county level, we first allocated FAF zone flows down to individual counties and then aggregated up to larger CBSAs. To accomplish this task, we used appropriate production, consumption, and port flow data when allocating totals—in both dollars and tonnage—to specific domestic origins and destinations.

Domestically, the estimation process varied slightly depending on the exact geography, mode, and type of flow in question. For example, we assigned flows between two distinct metropolitan areas on the basis of the magnitude of production and consumption in each area, while we used an additional gravity constraint when estimating flows that involved large FAF zones (such as state remainders) to match supply and demand over longer distances. A gravity constraint is a way to use distance alongside economic data when determining trade flows between places.

In all domestic regions, the estimation process followed three essential steps: (1) Allocate the commodity supply on the basis of the county share of industries producing this commodity; (2) Allocate the commodity demand on the basis of the county share of industries consuming this commodity; and (3) Balance the commodity production and attraction on the basis of modal availability. We then aggregated these county commodity flows in turn to their respective CBSAs, while approximating the original FAF aggregate totals for the particular commodity. We classified remaining flows not included in the CBSAs under state remainders.

Internationally, the estimation process relied more extensively on a domestic gravity constraint to allocate export and import flows, primarily because of commodity sourcing issues in FAF. Because FAF defines international movement in two ways—separating the domestic and international legs—there was a statistical concern regarding port-related metros over-assigned local production and consumption trade flows. Miami, for instance, not only served as an enormous port for moving exports out of the country, but FAF also recorded it as one of the largest producers (or origins) for these exports. Anchorage, likewise, served as a primary port of entry for imports, but it was designated one of the largest consumers (or final destinations) for these imports. Our new database, by contrast, used WISER trade data and an additional gravity constraint to link the origin for exports and destination for imports more directly in terms of patterns of economic production and consumption. The results are a relative match for past Metropolitan Policy Program export research, sharing a 0.91 correlation with ExportNation's 2010 goods data.[iv] However, because this report and ExportNation use different statistical bases, and only ExportNation includes service exports, the actual numbers will not match between the two datasets.

Among commodities that fall outside the scope of the CFS, crude petroleum (SCTG 16) required particular additional attention. Limited by the sample size for this commodity—along with numerous industry records suppressed for confidentiality—FAF relies on a variety of sources to estimate petroleum flows by value and weight at the county level. To address such gaps, our database allocates these missing flows to counties with non-suppressed refinery data.

In summary, our new database uses the same design as FAF but adds geographic granularity and increased data certainty. It still includes all 43 two-digit SCTG commodities and seven transportation modes.[v] Geographically, the database now includes 361 metropolitan areas, 48 state remainders, and 40 international geographies.[vi] Table A1 lists the specific countries, country groups, and continental remainders.

This report also includes assessment of trade across state lines, referred to as interstate trade. These measures required assigning a state to all 361 metropolitan areas. For those metropolitan areas that did not cross state lines, their home state received the designation. For those that did cross state

Table A1. International Geographies Included in Brookings Goods Trade Database

Foreign Geography	Geography Type
Argentina	Country
Brazil	Country
Canada	Country
Chile	Country
China	Country
Colombia	Country
France	Country
Germany	Country
India	Country
Japan	Country
Republic of Korea	Country
Mexico	Country
Netherlands	Country
Singapore	Country
South Africa	Country
Spain	Country
Turkey	Country
United Kingdom	Country
Western Africa	Country Group
Eastern Africa	Country Group
Northern Africa	Country Group
Middle Africa	Country Group
Caribbean	Country Group
Australia and New Zealand	Country Group
Melanesia	Country Group
Micronesia	Country Group
Polynesia	Country Group
Central Asia	Country Group
Eastern Europe	Country Group
Remainder of South America	Rest Of Group
Remainder of Central America	Rest Of Group
Remainder of Southern Africa	Rest Of Group
Remainder of North America	Rest Of Group
Remainder of Eastern Asia	Rest Of Group
Remainder of Southern Asia	Rest Of Group
Remainder of South-Eastern Asia	Rest Of Group
Remainder of Southern Europe	Rest Of Group
Remainder of Western Asia	Rest Of Group
Remainder of Northern Europe	Rest Of Group
Remainder of Western Europe	Rest Of Group

Source: Brookings Institution and Economic Development Research Group

lines, we used a population-based apportionment method to subdivide trade flows based on the level of population in the included states. For example, 42 percent of the Kansas City metropolitan area resides in Kansas counties while 58 percent of its population resides in Missouri counties. To determine Kansas City's own interstate trade flows, it was assumed that 58 percent of trade with Kansas was interstate—representing the share of metropolitan population in Missouri—and 42 percent was intrastate, representing the share living in Kansas. A similar state-based split would be applied for all other regions when trading with Kansas City.

Finally, the database and report analytics are only an estimation of expected goods trade and freight activity. While the CFS and FAF are based on an extensive survey of freight shippers—as is EDR's use of WISER's international shipping information—even the best surveys may over- or understate certain trade levels. Likewise, while EDR uses well-regarded gravity constraints and production and consumption data, these data modifiers can miss certain trading relationships. For example, the data modifiers have no method to purposely account for under-reported intrafirm trading relationships. These pitfalls are no different from other survey-based statistical analyses, but they are worth considering if certain trade levels or trading relationships appear off-base.

Time Periods Covered

Although FAF provides estimates of projected flows from 2007 through 2040, we only include 2010 provisional data in our database. Given the constantly changing nature of freight movement and other economic developments, it can be difficult to gauge these sudden—and sometimes lasting—fluctuations. Limitations and inconsistencies in existing freight data also make it challenging to track potential changes over time nationally, internationally, and between metro areas, most notably since FAF is the only subnational freight database and it precludes longitudinal comparisons. At the time of production, 2010 FAF estimates were the most current and comprehensive data available, which we adjusted to more precisely track commodity flows at the metropolitan scale. Future updates to our database would prove useful in monitoring freight movement changes over time, especially as the economy continues to emerge from the Great Recession.

Intermetropolitan Flows versus Intrametropolitan Flows

This particular report focuses on goods trade *between* metropolitan areas, meaning the geographic origin and destination are always different places. However, there is also a significant share of goods trade that occurs within metropolitan areas. An assessment of such intrametropolitan goods trade would require a closer examination of several alternate trading dynamics and particular freight concerns.

Measuring Trade via Value and Trade Corridors

This report uses only measures of value (in millions of dollars) to judge trading relationships between places. As compared to measures of weight, value better reflects the economic links between places and better translates comparisons to other economic indicators like industrial production and consumption.

This report also does not isolate trade for particular markets.

Instead, it creates trade corridors by judging bidirectional trading relationships between domestic regions and their trade with international geographies. We then analyze trade corridors through two distinct statistical approaches. The first involves looking at all trade corridors involving the same metropolitan or non-metropolitan area. This is referred to as a regional trade network and is the statistical approach reflected in the downloadable datasets. The second approach aggregates all trade corridors across the country—referred to as the national trade network—and removes duplicate corridors to account for double counting.

By focusing exclusively on value without measuring trade balances, trade corridor analysis will include trades based primarily around production and consumption activities alongside trades based on light value-add logistics activities. This is most noticeable in regions with large logistics clusters.

Trade Concentration and Trade Centrality

This report uses both statistical concentration and centrality measures to better understand how the national and regional trade networks function.

The core statistical technique for measuring trade concentration is GINI coefficients. This statistical technique measures the level of dispersion of a specific variable within a given population and is oriented toward expressing inequality, meaning a GINI coefficient of 0 reflects perfect equality and 1 represents perfect inequality. In this case, the given population size is the national trade network, specific entities are specific trade corridors, and the specific variable is the corridor's traded value. All concentration measures remove aggregate trade corridors valued at less than $1 million. This reduces the total quantity of trade corridors, but enhances the ability to judge regions which trade relatively a sizable amount of goods—and reduces the GINI coefficient in the process. The main paper only includes mention of the GINI coefficient for the national trade network, but Appendix C includes an analysis of regional trade network concentration and the related metropolitan areas' GINI coefficients.

As a core component of network analysis, centrality measures use a combination of total connections and their value to better understand how 'central' a particular actor is in a given network environment. This paper's centrality statistics are based on a weighted degree measure, which was calculated with the "tnet" package in R, a freeware statistical environment.[vii] The alpha used in these calculations was 0.5, which creates a relatively balanced approach between the number of total connections—also known as degree centrality—and the trade value of those specific connections. Like the GINI calculations, all routes worth less than $1 million were excluded to downplay the effect of aggregate connections.

Finally, the paper uses a fixed-effects panel regression model to better understand how other regional factors—like industrial output, population, and logistics employment—affect trade levels between places. Appendix B includes more information on this model's structure and its results.

Industry Connections and Commodity Groups

Goods trade volume and balances offer a useful way to gauge the profile of a metropolitan economy. By viewing commodities in light of the industries that "make" and "use" them, the following method allows us to assess this underlying relationship.

While partnering with EDR, we reviewed a series of input-output (I-O) tables, similar to those developed by the U.S. Bureau of Economic Analysis (BEA).[viii] As defined by BEA, output (or make) tables show the production of commodities by industry, while input (or use/recipe) tables show the uses of commodities by intermediate and final users. Put simply, output tables illustrate the types of goods that different industries produce (in dollars), while input tables show the variety of goods used by these industries (also in dollars) to produce their final goods or services.[ix] Furthermore, each industry features a unique "make share" and "use share" for specific commodities. Make shares depict the amount of a commodity that is produced per dollar of total output, and use shares depict the amount of a commodity required to produce every dollar of total output. In the furniture manufacturing industry, for instance, furniture products have a make share slightly less than 1, meaning that for every dollar of the industry's output, this commodity essentially represents the only final good produced. The same industry, though, commonly requires wood products to create this furniture, represented by a use share of less than 0.3. In other words, the industry uses 30 cents worth of wood products to create every dollar of output.

Table A2. Commodity Groups Included in Goods Trade Database

Commodity Name	Description	Relevant SCTG Codes
Agricultural Products	Includes various animal products, baked goods, and agricultural crops, ranging from fruits and vegetables to nuts and cereal grains. Also includes processed foods, tobacco products, and alcoholic beverages.	SCTG 01-09
Stones/Ores	Includes stone-related goods like gravel, a variety of non-metallic minerals like salt, and metal ores like iron.	SCTG 10-14
Energy Products	Includes coal and its related byproducts, oil products like crude petroleum and gasoline, and other liquefied fuels and oils.	SCTG 15-19
Chemicals/Plastics	Includes plastics, fertilizers, rubber, and a host of other organic and inorganic chemicals.	SCTG 20, 22-24
Pharmaceuticals	Includes pharmaceuticals and chemical mixtures for medical use.	SCTG 21
Wood Products	Includes logs, lumber, and other wood products, such as particle board. Also includes numerous paper products in the form of pulp, sheets, or printed materials.	SCTG 25-29
Textiles	Includes fabrics, yarns, and similar textiles used for clothing, carpets, and household furnishings. Also includes leather used for footwear, luggage, and other apparel.	SCTG 30
Metals	Includes base metals, such as steel, copper, and aluminum, in the form of bars, rods, and wire. Also includes ceramics, glass, and other cement mixtures.	SCTG 31-32
Machinery/Tools	Includes machines, parts, and gears used in a variety of mechanical equipment, such as engines, fans, and refrigerators.	SCTG 34
Tools/Manufacturing Products	Includes metal articles and tools like pipes and industrial cutlery, plus miscellaneous manufactured products like toys, clocks, and musical instruments.	SCTG 33, 40
Electronics	Includes a range of electrical components and equipment, from circuits and semiconductors to televisions and computers. Also includes communications equipment and transmission apparatus.	SCTG 35
Transportation Equipment	Includes parts and vehicles for automobiles, railroads, aircraft, ships, and other transportation equipment.	SCTG 36-37
Precision Instruments	Includes medical, scientific, and optical instruments, among other advanced surgical and navigational tools.	SCTG 38
Furniture	Includes household and office furniture, mattresses, medical furniture, and lighting fixtures.	SCTG 39
Waste/Scrap	Includes scrap and waste from wood, paper, glass, and metals.	SCTG 41
Mixed Freight	Includes miscellaneous food and supplies for offices and retail establishments, such as convenience stores and restaurants.	SCTG 43
Unknown	Includes goods not classified under any other commodity group.	SCTG 99

Source: Brookings Institution and Economic Development Research Group

In many industries, there is a direct 1:1 relationship for particular commodities based on their make shares. Industries that specialize in automobile manufacturing, logging, or tobacco farming are among those that typically produce only one type of commodity. In contrast, there is often a one-to-many relationship for industries and commodities based on their use share, highlighting how industries frequently use different input commodities to create their output goods. In most cases, SCTG commodities such as base metals and machinery may account for only a fraction of a cent for every dollar of production. These commodities, in turn, are used as inputs in hundreds of industries, from steel manufacturers to electronics manufacturers.

With this background in mind, we analyzed the make-use shares for the 43 2-digit SCTG commodities across EDR's input-output matrix based on the North American Industry Classification System (NAICS). To manage the many industries that made products falling under multiple commodity codes, we created our own commodity classification system of 17 new commodity groups, shown in Table A2.

This created a cleaner crosswalk between NAICS economic output data and SCTG commodity codes.

We were thereby able to clearly relate 107 "production-oriented" and 206 "service-oriented" four-digit NAICS industries to one of the 17 commodity groups. In short, the 107 production-oriented industries all had a make share for at least one commodity, while the remaining 206 service-oriented industries did not have a make share for any commodity. As a result, we classified production-oriented industries under 17 commodity groups, and created a 16th commodity group—for non-commodities—to classify service-oriented industries. While these service-oriented industries did not produce any physical goods, they did play an important role in using the 17 other commodities to provide their services, as based on their use shares.

After linking commodities with their respective NAICS industries, we were able to gauge how much production was linked to specific inputs and outputs across different metro areas. For each metro area, we downloaded 2010 GDP data from Moody's Analytics that applied to the four-digit industries included in our crosswalk. We then calculated the relative amount of production associated with each commodity on the basis of the industries linked to these goods, first in terms of output and later in terms of input.

There are two critical limitations to I-O tables and commodity crosswalks for this report's analytical approach. First, I-O tables do not capture household consumption patterns. Although I-O tables do show how much food or energy an industry may consume, they do not reference how much of similar products households may consume. In this sense, an I-O table cannot fully predict the aggregate level of commodity consumption taking place in a particular geography. Second, this report relied on a single I-O table for the entire country, and therefore does not capture variable industrial patterns by metropolitan area. Firms within the same industry will vary in the value of their inputs and outputs, meaning each metro should technically follow a unique I-O table based on its unique collection of firms and industry quality. This omission from our commodity-economic comparison will affect the results to an unknown degree and is an important area to improve in future research.

Appendix A. Notes

i. The complete FAF3 documentation is available at: **http://faf.ornl.gov/fafweb/Data/FAF3ODCMOverview.pdf** [accessed July 2014].

ii. To learn more about the CFS, see the online summary at: www.census.gov/econ/cfs/ [accessed July 2014].

iii. The United Nations country-level codes and continental groupings are available at: **http://unstats.un.org/unsd/methods/m49/m49regin.htm** [accessed July 2014].

iv. This correlation compares the 361 metropolitan areas shared between the two datasets. The complete ExportNation dataset and research series is available at: **www.brookings.edu/about/projects/state-metro-innovation/mei** [accessed July 2014].

v. Note that EDR's estimation process caused two SCTG commodities—Mixed Freight (SCTG 43) and Commodity Unknown (SCTG 99)—to be separated individually in domestic trade but not in international trade. However, they are still included in the international totals, collapsed with the other commodity groups.

vi. Due to statistical limitations, the following five metropolitan areas were not included in the database: Cape Girardeau-Jackson, MO-IL; Lake Havasu City-Kingman, AZ; Manhattan, KS; Mankato-North Mankato, MN; and Palm Coast, FL. All five were upgraded from micropolitan statistical areas to metropolitan statistical areas in the 2000s. Their trading relationships are added to the appropriate "Remainder of State" totals.

vii. For more information on the tnet package, see: **http://toreopsahl.com/tnet/software/** [accessed July 2014].

viii. To see the full methodology of BEA tables, see: **www.bea.gov/papers/pdf/IOmanual_092906.pdf** [accessed July 2014].

ix. Note that goods can be simply consumed as well.

Appendix B. Research Model

This report uses a regression model to better understand how other regional factors affect trade levels between domestic places.

The model implemented a fixed effect panel regression to control for any unaccounted metro-level variation that is constant over time. This model offers an attractive and conservative approach to the task of estimating the effects of distance, logistics workers, and other variables of interest since it minimizes the risk of omitted variable bias with fixed metro-level effects. The main drawback is that the additional controls reduce estimation efficiency and may make the model susceptible to over-fitting, which reduces its efficacy as a predictive tool. In any event, the results are highly significant with signs generally consistent with theoretical expectations.

The dependent variable was the trade flowing from one region to another, subdivided into 14 distinct commodity groups.[i] As such, the model was run 15 times—once for the aggregation of all commodity-based trade flows and then a separate model for each commodity group. These total flows were then logged, which means the effects of the independent variable represent a percentage change in trade levels. Finally, the model only included routes worth at least $1 million to minimize the statistical impact of relatively small trade flows.

The model included nine independent variables, fit into four groups. The first variable was the mileage between trading regions, as measured by Euclidean distance within GIS software. The second group included the expected industrial production and consumption within the traded commodity—as reported in billions of dollars—and was measured in both the origin and destination region. The production and consumption levels were based on Moody's Analytics output data and assigned to particular commodities based on the input-output table described in Appendix A. The third group included logistics workers—measured in thousands of people—in both the origin and destination region. The data were based on Moody's Analytics employment data and a specific set of logistics industries determined by the Brookings Institution.[ii] The fourth category included population—reported in millions of people—in both the origin and destination region. The data were based on Brookings calculations from the United States Census Bureau.

Two separate international models were run using import and export flows as the dependent variable, and included a slightly different set of independent variables. Both continued to use production, consumption, population, and logistics workers as independent variables for the domestic markets. For the international regions, the independent variables included population, GDP, and per capita GDP, all of which were sourced from the United Nations.

Table B1 reports the results from the domestic model, which are also interpreted within the report. The results related to mileage, population, and logistics workers all confirmed general economic theory, and as such we included those results throughout the paper. The model also confirmed general expectations that industrial composition has a significant effect on trade flows. However, the variability in significance and coefficient size suggests that regions trade specific commodities for vastly different reasons (see Box D in the report). This particular area demands further research, and we have made the entire dataset available so the greater research community can explore what factors motivate goods trade.

Appendix B. Notes

i. This model excluded the Mixed Freight, Waste/Scrap, and Unknown commodity groups because they either did not correspond to industrial output categories, did not include clear product types, or were not included within international trade.

ii. For more information on logistics employment and infrastructure employment in general, see: Joseph Kane and Robert Puentes, "Beyond Shovel-Ready: The Extent and Impact of U.S. Infrastructure Jobs " (Washington: Brookings Institution, 2014).

Table B1. Regression of Independent Variable on Log of Trade Flows

INDEPENDENT VARIABLES	All Outflows	Agricultural Products	Stones and Ores	Energy Products	Chemicals and Plastics	Wood Products	Textiles	Metals	Machinery	Electronics	Transportation Equipment	Precision Instruments	Furniture	Pharmaceuticals	Tools and Mfg Products
Miles (hundred miles)	-0.032***	-0.047***	-0.025***	-0.036***	-0.044***	-0.039***	-0.020***	-0.046***	-0.031***	-0.021***	-0.032***	-0.012***	-0.031***	-0.033***	-0.030***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partner Consumption in Commodity (billion $)	0.001	-0.303***	1.023***	0.017***	0.555***	0.269***	-0.360	0.274***	0.352***	0.102***	0.102*	0.440***	1.023***	-0.382*	0.577***
	(0.001)	(0.030)	(0.342)	(0.004)	(0.021)	(0.029)	(0.283)	(0.019)	(0.037)	(0.025)	(0.060)	(0.151)	(0.149)	(0.207)	(0.028)
Partner Production in Commodity (billion $)	0.031***	0.179***	0.662***	0.008***	-0.172***	-0.094***	0.043	0.274***	0.037***	0.005	0.059***	-0.003	0.171***	0.086	-0.046***
	(0.001)	(0.011)	(0.099)	(0.002)	(0.010)	(0.009)	(0.064)	(0.021)	(0.013)	(0.007)	(0.017)	(0.011)	(0.065)	(0.056)	(0.011)
Home Consumption in Commodity (billion $)	-0.024***	-0.727***	1.537***	-0.000	0.202***	0.154***	-1.716***	0.059***	0.055	0.266***	-0.997***	1.125***	0.126	1.164***	0.210***
	(0.001)	(0.029)	(0.410)	(0.006)	(0.021)	(0.034)	(0.277)	(0.019)	(0.038)	(0.023)	(0.066)	(0.145)	(0.187)	(0.177)	(0.026)
Home Production in Commodity (billion $)	0.063***	0.386***	0.257***	0.035***	0.128***	0.065***	0.821***	0.592***	0.182***	-0.019***	0.432***	0.040***	1.286***	-0.291***	0.200***
	(0.001)	(0.010)	(0.070)	(0.002)	(0.009)	(0.009)	(0.061)	(0.019)	(0.013)	(0.006)	(0.019)	(0.010)	(0.044)	(0.048)	(0.010)
Partner Population (million people)	0.017***	0.098***	-0.020	-0.023	-0.246***	-0.059***	0.068***	-0.011	-0.054***	0.009	-0.004	-0.025	-0.062***	0.036	-0.089***
	(0.002)	(0.012)	(0.018)	(0.017)	(0.011)	(0.016)	(0.018)	(0.008)	(0.012)	(0.011)	(0.014)	(0.017)	(0.018)	(0.027)	(0.009)
Home Population (million people)	0.016***	0.211***	-0.020	0.033	-0.073***	-0.132***	0.127***	0.056***	-0.007	-0.066***	0.175***	-0.094***	-0.042**	-0.173***	-0.037***
	(0.002)	(0.011)	(0.021)	(0.021)	(0.011)	(0.018)	(0.017)	(0.008)	(0.011)	(0.010)	(0.015)	(0.016)	(0.021)	(0.024)	(0.008)
Home Logistics Workers (Thousands)	0.012***	0.007***	-0.002	0.001	0.010***	0.015***	0.005***	-0.002*	0.008***	0.015***	0.015***	0.005***	0.006***	0.020***	0.012***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partner Logistics Workers (Thousands)	0.013***	0.017***	0.003*	0.010***	0.018***	0.015***	0.011***	0.004***	0.010***	0.012***	0.013***	0.010***	0.007***	0.015***	0.011***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	1.399***	1.352***	1.069***	1.648***	1.242***	1.237***	1.161***	1.190***	1.257***	1.100***	1.291***	0.972***	0.933***	1.456***	1.129***
	(0.007)	(0.010)	(0.023)	(0.014)	(0.008)	(0.009)	(0.012)	(0.010)	(0.010)	(0.009)	(0.010)	(0.014)	(0.015)	(0.015)	(0.008)
Observations	467,362	49,631	5,258	25,832	49,478	36,203	25,526	30,843	36,438	41,144	35,966	17,960	13,748	20,268	46,081
R-squared	0.184	0.252	0.055	0.136	0.299	0.199	0.202	0.219	0.164	0.250	0.196	0.192	0.172	0.141	0.271

*Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Brookings analysis of trade data across 449 geographies based on EDR trade flows, Moody's Analytics, Census, and United Nations data.*

Appendix C. Regional Trade Network Concentration

Analyzing regional trade networks—a set of routes starting or ending in the same metropolitan or non-metropolitan area—controls for many of the size factors present in national trade network analysis. For example, it is hard to compare trade between New York and Los Angeles ($24.4 billion) to that between Cleveland and Lawrence, KS ($1.0 million). Still, this analytical perspective confirms similar findings as those from the national level: Regional trade networks are highly concentrated among a select group of metropolitan areas and distribution hubs, which can benefit from more targeted infrastructure investment.

This is certainly the case for those metropolitan areas with the most concentrated regional networks. Each shares the common characteristic of a small set of neighboring trade partners, and many of those neighbors are in relative geographic isolation from other parts of the country. Stockton, CA has the single most concentrated network, with a GINI coefficient of 0.92. As a whole, the California economy is also highly interrelated to its statewide peers, trading over 55 percent of its goods with only three neighboring metropolitan areas: Modesto, Sacramento, and San Francisco. Other metropolitan areas with above-average network concentrations also fit this characteristic set, including Modesto (0.90), Tucson (0.86), and Provo (0.84).

Meanwhile, even metropolitan areas with the least concentrated trade networks mostly rely on a distinct set of trade partners, as evident in logistics hubs like Chicago (0.70 GINI), Atlanta (0.71), and Dallas (0.71). For instance, 37.8 percent of all of Chicago's goods move between only 20 other places, domestically and internationally. Put another way, less than 5 percent of Chicago's possible trading partners generate almost 40 percent of the metropolitan area's trade. Other metropolitan areas with lower network concentrations include Memphis, Minneapolis, and Indianapolis—all of which maintain large logistics industries. Table 4 summarizes the 10 most and least concentrated regional trade networks across the country's 100 largest metro areas.

The complete set of GINI coefficients for the entire county and each individual region—including trade in specific commodities—can be downloaded from the project web site.

Table C. Top and Bottom Trade Network Concentrations, 100 Largest Metropolitan Areas, 2010

Metropolitan Area	Traded Goods Value ($ mil)	GINI Concentration	Most Common Trading Partner
Top 10			
Stockton, CA	$72,894.2	0.92	Modesto, CA
Modesto, CA	$58,840.6	0.90	Stockton, CA
Tucson, AZ	$36,630.6	0.86	Phoenix-Mesa-Glendale, AZ
San Jose-Sunnyvale-Santa Clara, CA	$209,629.9	0.85	San Francisco-Oakland-Fremont, CA
Bakersfield-Delano, CA	$41,078.9	0.85	Los Angeles-Long Beach-Santa Ana, CA
Oxnard-Thousand Oaks-Ventura, CA	$77,317.3	0.85	Los Angeles-Long Beach-Santa Ana, CA
Sacramento--Arden-Arcade--Roseville, CA	$107,144.7	0.84	Stockton, CA
Provo-Orem, UT	$24,787.3	0.84	Salt Lake City, UT
Baton Rouge, LA	$115,144.2	0.84	New Orleans-Metairie-Kenner, LA
San Francisco-Oakland-Fremont, CA	$243,566.7	0.84	San Jose-Sunnyvale-Santa Clara, CA
Bottom 10			
Memphis, TN-MS-AR	$184,309.6	0.74	Baltimore-Towson, MD
Knoxville, TN	$51,841.4	0.73	Rest of Tennessee
Pittsburgh, PA	$138,850.6	0.73	Rest of Pennsylvania
Minneapolis-St. Paul-Bloomington, MN-WI	$218,902.6	0.73	Rest of Minnesota
Charleston-North Charleston-Summerville, SC	$37,786.3	0.73	Rest of South Carolina
Indianapolis-Carmel, IN	$149,817.1	0.73	Chicago-Joliet-Naperville, IL-IN-WI
New York-Northern New Jersey-Long Island, NY-NJ-PA	$719,962.4	0.72	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Dallas-Fort Worth-Arlington, TX	$420,461.2	0.71	Houston-Sugar Land-Baytown, TX
Atlanta-Sandy Springs-Marietta, GA	$336,996.4	0.71	Rest of Georgia
Chicago-Joliet-Naperville, IL-IN-WI	$657,692.9	0.70	Milwaukee-Waukesha-West Allis, WI

Source: Brookings analysis of EDR and Census data

Endnotes

1. Brookings analysis of EDR data.
2. Brookings analysis of EDR data.
3. Brookings analysis of Bureau of Transportation Statistics data.
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17. Appendix A includes a complete list of metropolitan areas, based on 2000 definitions, not included in this database. These metropolitan areas are part of their states' non-metropolitan remainders.
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20. Brookings analysis of Census and BEA data.
21. For more on how trade theory applies to metropolitan economies, see: Alan Berube and Joseph Parilla, "MetroTrade: Cities Return to their Roots in the Global Economy" (Washington: Brookings Institution, 2012).
22. By removing all trade corridors worth less than $1 million, the Lorenz curve in Figure 1 is slightly more equal than it would be otherwise.
23. To remove excess statistical noise in the GINI calculation, all corridors trading less than $1 million in total goods were removed. For more information on this methodological decision, see Appendix A. In addition to concentration

in the national trade network, regional trade networks are also highly concentrated. When looking at all 409 domestic regions, the GINI coefficient range is 0.67 to 0.92. For more information on concentration within regional trade networks, see Appendix C.

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About the Metropolitan Infrastructure Initiative

The Metropolitan Infrastructure Initiative was formed to develop timely independent analysis, frame key debates, and offer policy recommendations to help leaders in the United States and abroad address key infrastructure challenges. This and other publications, speeches, presentations, and commentary on infrastructure are available at: **http://www.brookings.edu/about/programs/metro/infrastructure-initiative**

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Intra-Metro Transportation includes local roads and bridges; public transit such as subways and buses; taxis and limousines; sightseeing transportation; and bicycle/pedestrian infrastructure.

Inter-Metro Transportation includes passenger rail, airports, and highways, and inter-urban and rural bus transportation.

Trade and Logistics includes freight rail, air cargo operations, trucking, seaports/inland waterways, transportation support, and warehousing and express/local delivery services.

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Water includes clean/drinking water, stormwater, wastewater, sewage/water treatment facilities, and "green" infrastructure critical to conserving related natural resources.

Telecommunications include broadband and transmission infrastructure (wired, wireless, and satellite), concentrated in facilities outside radio and television broadcasting.

Public Works include streetscapes, land redevelopment, and waste/landfills (solid waste, hazardous materials, and remediation).

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The Global Cities Initiative equips city and metropolitan area leaders with the practical knowledge, policy ideas, and connections they need to become more globally connected and competitive.

Combining Brookings' deep expertise in fact-based, metropolitan-focused research and JPMorgan Chase's market expertise and longstanding commitment to investing in cities, this initiative:

- Helps city and metropolitan leaders better leverage their global assets by unveiling their economic starting points on such key indicators as advanced manufacturing, exports, foreign direct investment, freight flow, and immigration.
- Provides metropolitan area leaders with proven, actionable ideas for how to expand the global reach of their economies, building on best practices and policy innovations from across the nation and around the world.
- Creates a network of U.S. and international cities interested in partnering together to advance global trade and commerce.

The Global Cities Initiative is chaired by Richard M. Daley, former mayor of Chicago and senior advisor to JPMorgan Chase, and directed by Bruce Katz, Brookings vice president and co-director of the Metropolitan Policy Program, which aims to provide decision makers in the public, corporate, and civic sectors with policy ideas for improving the health and prosperity of cities and metropolitan areas.

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Core activities include:

Independent Research: Through research, the Global Cities Initiative will make the case that cities and metropolitan areas are the centers of global trade and commerce. Brookings will provide each of the largest 100 U.S. metropolitan areas with baseline data on its current global economic position so that metropolitan leaders can develop and implement more targeted strategies for global engagement and economic development.

Catalytic Convenings: Each year, the Global Cities Initiative will convene business, civic and government leaders in select U.S. metropolitan areas to help them understand the position of their metropolitan economies in the changing global marketplace and identify opportunities for strengthening competitiveness and expanding trade and investment. In addition, GCI will bring together metropolitan area leaders from the U.S. and around the world in at least one international city to explore best practices and policy innovations for strengthening global engagement, and facilitate trade relationships.

Global Engagement Strategies: In order to convert knowledge into concrete action, Brookings and JPMorgan Chase launched the Global Cities Exchange in 2013. Through a competitive application process, economic development practitioners in both U.S. and international cities are selected to receive hands-on guidance on the development and implementation of actionable strategies to enhance global trade and commerce and strengthen regional economies.

Acknowledgments

The authors thank the following individuals for their comments or advice on drafts of the paper and continued input on the Metro Freight project's direction: Alan Berube, Scott Drumm, Stephen Fitzroy, Bruce Katz, Siddharth Kulkarni, Jesus Leal-Trujillo, Marc Levinson, Nicholas Marchio, Zachary Neal, Joseph Parilla, Ethan Pollack, Jean-Paul Rodrigue, Patrick Sabol, Joshua Schank, Noah Siegel, and Page Siplon. We want to extend an enormous thank you to Robert Puentes for listening to our concerns, offering solutions, and providing top-notch editorial assistance. We also thank David Jackson for editorial assistance, Alec Friedhoff and Stephen Russ for visual development, and Sese-Paul Design for design and layout.

The Metropolitan Policy Program at Brookings would also like to thank the Surdna Foundation, Ford Foundation, and GE Foundation for their support of the Program's Metropolitan Infrastructure Initiative.

Finally, the program would like to thank the Metropolitan Leadership Council, a network of individual, corporate, and philanthropic investors that provides us financial support but, more importantly, a true intellectual and strategic partnership.

This report is made possible by the Global Cities Initiative: A Joint Project of Brookings and JPMorgan Chase.

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