

# **THE IMPACTS OF RIDESHARE AND DELIVERY PLATFORMS ON THE MASSACHUSETTS ECONOMY**

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## **-----ABSTRACT-----**

- Rideshare and delivery platforms likely increase economic activity in Massachusetts by around \$8.3 billion annually, equivalent to 1.3 percent of the Massachusetts economy. This increased economic activity generates over \$503 million in state and local tax revenue.
- The economic impacts associated with rideshare and delivery platforms are larger when unemployment is higher and consumers are less willing to engage in in-person services, such as eating in restaurants or shopping in stores, as was the case during the pandemic. Economic impacts are smaller when the economy is at full employment and consumers are more willing to engage in in-person services.
- These economic impacts are due to the following:
  - » Rideshare and delivery platforms generate a service that might otherwise exist only on a much smaller scale. These platforms allow independent workers who provide these services to earn additional income.
  - » In providing these services, independent workers on rideshare and delivery platforms spend a portion of their earnings on inputs, such as gas and auto maintenance. These are expenses for these independent workers, but they are additional earnings for those who supply these inputs.
  - » These independent workers and those who supply them with inputs then spend their additional earnings on general consumption, such as housing, health care, education, and other goods and services.
  - » Those engaged in providing housing, health care, education, and other goods and services thereby also earn additional income, which they spend on consumption.
  - » Delivery platforms are also associated with greater demand for restaurant services, generating additional income and spending for restaurant workers, which then also “multiplies” through the economy.

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## **1. Qualifications**

1. My name is Leo Feler. I am a senior economist and adjunct assistant professor at the University of California at Los Angeles, Anderson School of Management (UCLA Anderson). I have served on the faculty of UCLA Anderson and as a senior economist at the UCLA Anderson Forecast Center since July 2020.
2. I also serve as a senior economist at Cornerstone Research, an economic and financial consulting firm. I have served as a senior economist at Cornerstone Research since July 2018.
3. I worked as a management consultant at the Boston Consulting Group, between 2016 and 2018, and as an assistant professor of international economics at the Johns Hopkins University School of Advanced International Studies, between 2010 and 2016.
4. I completed my PhD in economics at Brown University in Providence, Rhode Island, in 2010. My fields of expertise are urban/regional economics, labor economics, and economic growth.
5. I earned a master's degree in economics from Brown University in 2006, a master's degree in international policy studies from Stanford University in 2002, and dual bachelor's degrees in economics and international relations, with honors and distinction, from Stanford University, also in 2002.
6. At UCLA Anderson, I teach courses in business and economic forecasting and in business and economics in emerging markets. Previously, I have taught courses in applied econometrics, economic development, and urban/regional economics.
7. My research focuses on the local economic impacts of policy and economic shocks. In the US, I have studied the local economic impacts of trade competition. In Brazil, I have studied the local economic impacts of municipal service expansion and federal credit provision.

8. I have co-authored academic publications that have appeared in the *American Economic Journal: Economic Policy*, *Journal of Monetary Economics*, and *Journal of Urban Economics*. I have also published in *Wealth Management* and various UCLA Anderson Forecast Quarterly Reports. My work has been cited in the *New York Times*, *The Atlantic*, *Wall Street Journal*, *CNN*, *Los Angeles Times*, *CBS News*, *Spectrum News*, *CalMatters*, *Sacramento Bee*, *Politico*, *Capitol Weekly*, *Time Magazine*, and *Business Insider*.

9. I have consulted on economic matters for companies in industries including consumer and retail goods, technology, pharmaceuticals, advertising, travel and tourism, and telecommunications.

10. I have attached my CV as Appendix A.

## **2. Assignment**

11. Flexibility and Benefits for Massachusetts Drivers has asked me to conduct an analysis of the impacts that rideshare and delivery platforms have on the Massachusetts economy.

12. Specifically, Flexibility and Benefits for Massachusetts Drivers has asked me to:

- a. Analyze the direct income generated in Massachusetts because of rideshare and delivery platforms that would not otherwise have been generated without these platforms;
- b. Analyze the “multiplier effect” that the additional income from rideshare and delivery platforms generates each year in Massachusetts, which includes the indirect effect on employment and income in other sectors (e.g., from rideshare and delivery drivers using automobile maintenance services, thereby generating employment and income in this sector) and the induced effect on employment and income in other sectors (e.g., from the additional purchasing power that rideshare and delivery workers have);



- c. Review research findings on why people seek work through rideshare and delivery platforms; and
- d. Review recent macroeconomic data and explain the potential role of rideshare and delivery platforms in the current economic environment.

13. For the preparation of this report, I am being compensated at my standard billing rate. My compensation in this matter is in no way contingent or based on the content of my opinions on this or any other matter. I have previously conducted similar analyses on the impact of rideshare platforms on California's economy,<sup>1</sup> as part of my role as a Senior Economist at the UCLA Anderson Forecast Center, for which I received no compensation aside from my regular UCLA salary. I am being compensated for this report because analyses of the Massachusetts economy are beyond the scope of my role as a Senior Economist at UCLA, and therefore, time spent on such analyses cannot be funded through my UCLA salary.

14. I have based my opinions on the information available to me at this point in time, as well as on my training and experience. I may modify and update my opinions as new information becomes available.

### **3. Summary of Opinions**

15. When governments enact policies, it is common for them to analyze the economic impacts those policies are likely to have. For example, the Congressional Budget Office (CBO) tends to score legislation based on revenue and budgetary impacts, accounting for effects on economic activity in the US.<sup>2</sup> Similarly, Massachusetts regularly evaluates the effects of its legislative and tax policies.<sup>3</sup> In this report, following a similar methodology as the CBO and Massachusetts Department of Revenue, I assess the economic impacts related to the growth of rideshare and delivery platforms in Massachusetts.

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<sup>1</sup> See Leo Feler, "Proposition 22 and the Reclassification of Uber and Lyft Drivers as Employees versus Independent Contractors," UCLA Anderson Forecast, Forecast Direct No. 1, September 2020, available at: [https://www.anderson.ucla.edu/documents/areas/ctr/forecast/FoDi/ForecastDirect\\_No\\_1.pdf](https://www.anderson.ucla.edu/documents/areas/ctr/forecast/FoDi/ForecastDirect_No_1.pdf), accessed on March 14, 2022.

16. First, I present an initial scenario using standard methods and assumptions that are widely used by government and industry when modeling economic impacts. Then, to estimate the smallest effect that rideshare and delivery platforms may have, I use a set of assumptions that are much more conservative than normally used to measure economic impacts. Finally, I present an average of the economic impacts from these two scenarios, an approach that may be the most useful so as to neither overstate nor understate the economic impacts associated with rideshare and delivery platforms.

17. In 2021, using the initial scenario assumptions, rideshare and delivery platforms are associated with an estimated increase in economic activity of approximately \$12.4 billion in Massachusetts, equivalent to 1.9 percent of the Massachusetts economy.<sup>4</sup> In other words, the growth of rideshare and delivery platforms in Massachusetts likely accounts for 1.9 percent of the value of all the goods and services produced in Massachusetts in 2021. Equivalently, without these platforms, Massachusetts' economy would tend to be 1.9 percent or \$12.4 billion smaller.

18. Breaking down this impact, rideshare and delivery platforms are associated with an estimated \$4.6 billion in additional labor income, \$375 million in additional local tax revenue, \$384 million in additional state tax revenue, and over 92,000 full-time equivalent jobs in sectors outside of ground passenger transportation and courier/delivery services. These results are summarized in Exhibit 1.

19. These results come about because of the additional income that independent rideshare and delivery workers earn due to the growth of rideshare and delivery platforms in Massachusetts and because of increased earnings for restaurant workers associated with higher demand for meal delivery due to the growth of delivery platforms. These higher earnings for

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<sup>2</sup> See Congressional Budget Office, "Processes," available at: <https://www.cbo.gov/about/processes>; accessed on March 14, 2022.

<sup>3</sup> See, for example, Massachusetts Department of Revenue, Massachusetts Tax Expenditure Review Commission, "Biennial Report of the Tax Expenditure Review Commission," March 2021, available at: <https://www.mass.gov/doc/terc-march-2021-final-report>, accessed on March 14, 2022.

<sup>4</sup> Massachusetts' GDP was \$637 billion in Q3 2021, at a seasonally adjusted annualized rate. \$12.4 billion is 1.9% of \$637 billion. See Federal Reserve Bank of St. Louis, "Gross Domestic Product: All Industry Total in Massachusetts," Series MANQGSP, available at: <https://fred.stlouisfed.org/series/MANQGSP>, accessed on March 14, 2022.

rideshare, delivery, and restaurant workers then “multiply” through the Massachusetts economy through two channels.

20. First, producing more rideshares, deliveries, and restaurant meals requires inputs. These are expenses for these sectors but they are income for the sectors that provide inputs. For example, more rideshares also implies more earnings for auto mechanics and car wash attendants.

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**EXHIBIT 1**

***Summary of economic impacts using initial case assumptions: in 2021, the growth of rideshare and delivery platforms in Massachusetts is associated with additional economic output of \$12.4 billion, including additional labor income of \$4.6 billion, additional employment in sectors outside of ground passenger transportation and courier/delivery services of over 92,000 full-time equivalent workers, additional local tax revenue of \$375 million, and additional state tax revenue of \$384 million***

	Economic Output	Labor Income	Other Sector FTE Employment	Local Taxes	State Taxes
Effect Associated with Rideshare Platforms (based on 2018 data)	\$1,368,293,792	\$902,858,410	3,982	\$21,801,663	\$43,382,187
Effect Associated with Delivery Platforms (based on 2021 forecasts)	\$443,710,036	\$287,459,292	1,421	\$7,434,140	\$13,955,116
Effect of Additional Demand for Restaurant Services Associated with the Growth of Delivery Platforms (based on 2021 forecasts)	\$10,546,566,712	\$3,425,197,706	87,572	\$345,703,859	\$327,147,336
<b>TOTAL ECONOMIC IMPACT</b>	<b>\$12,358,570,540</b>	<b>\$4,615,515,408</b>	<b>92,975</b>	<b>\$374,939,662</b>	<b>\$384,484,639</b>

Source: IMPLAN model; US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: Initial case assumptions. Other Sector FTE Employment is employment outside of the ground passenger transportation services sector and outside of the courier/delivery services sector associated with the growth of rideshare and delivery platforms. For courier/delivery and restaurants, the analysis is based on forecasts for 2021. For rideshare, the analysis is based on 2018 data, which are the latest data available. However, given the decline in rideshare usage during the pandemic (see Section 9), the 2018 values for independent rideshare drivers' earnings likely represents the values for 2021, implying that there would have been no net growth in independent rideshare drivers' aggregate earnings between 2018 and 2021 because of the decline in rideshare demand during the pandemic.

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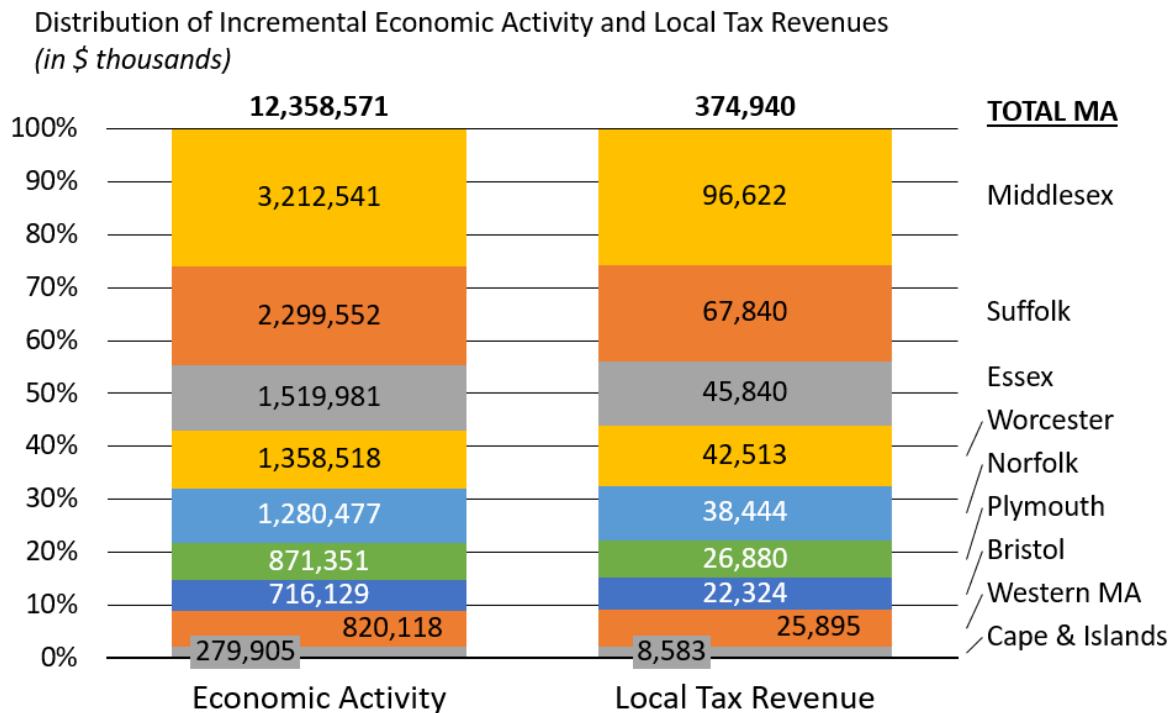
21. Second, the additional earnings of independent rideshare workers, independent delivery workers, restaurant workers, and all of those who supply inputs to these services also multiply through the economy as these workers spend their additional income on goods and services more broadly. For example, housing, healthcare, education, and entertainment, as well as other goods and services, also experience increased demand and output as workers spend their additional earnings.

22. We can also examine the distribution of these economic effects by county. Exhibit 2 shows the additional economic activity and local tax revenue by county in Massachusetts using 2018 data from the ground passenger

transportation services sector and from 2021 forecasts for the courier/delivery services sector and restaurants.<sup>5</sup> As shown in Exhibit 2, the estimated economic benefits associated with rideshare and delivery platforms are widespread throughout Massachusetts.

## EXHIBIT 2

**Summary of county-level impacts using initial case assumptions: the estimated impact on economic output and local tax revenue associated with the growth of rideshare and delivery platforms is widespread throughout Massachusetts**



Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Initial case assumptions. The distribution of economic activity and local tax revenue is based on how much independent rideshare and delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

23. The results described here are the initial case results for the likely economic impacts of rideshare and delivery platforms in Massachusetts in 2021. We can also consider sensitivities to these initial case results.

24. When we consider the economic impacts of rideshare and delivery platforms, we can consider what these workers would have been doing if not for rideshare and delivery, and we can consider what consumers would have done if they did not have the option of using rideshare and delivery

<sup>5</sup> See fns. 6, 11, and 25 for definitions of the ground passenger transportation services sector, courier/delivery services sector, and the restaurant services sector.

platforms. If the alternative for independent rideshare and delivery workers is that they would not have been working otherwise, then the direct economic impact of rideshare and delivery platforms is entirely incremental, and there is no substitution from earnings that independent rideshare and delivery workers might have earned otherwise. For consumers, if rideshares were not available, they may have driven their own cars to their destinations, and if delivery were not available, they may have picked up items themselves or they may have cooked their own meals at home rather than ordered from restaurants.

25. As I discuss in this report, even with conservative assumptions about what independent rideshare and delivery platform workers and consumers would have done otherwise, I still find the economic impact of rideshare and delivery platforms is to increase economic activity in Massachusetts by 0.6 percent of the state's GDP, or approximately \$4.2 billion in 2021. The economic impacts based on these conservative assumptions are shown in Exhibit 3 and Exhibit 4.

### **EXHIBIT 3**

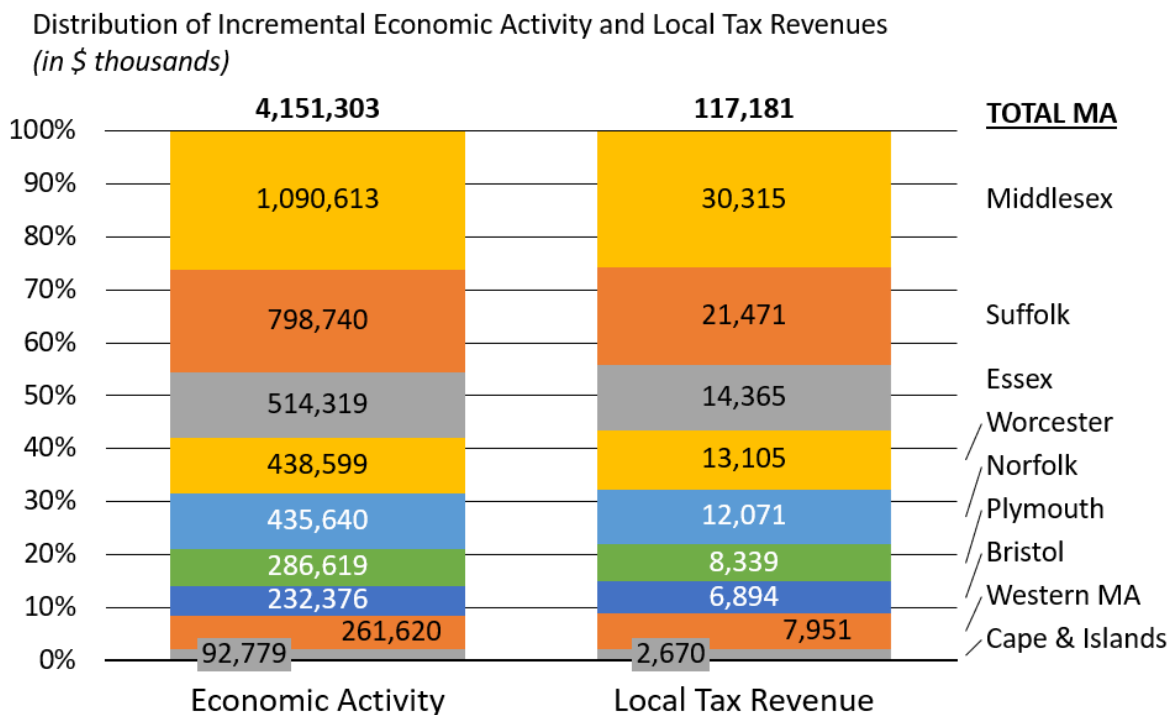
***Summary of economic impacts using conservative assumptions: in 2021, the growth of rideshare and delivery platforms in Massachusetts is associated with additional economic output of \$4.2 billion, including additional labor income of \$1.7 billion, additional employment in sectors outside of ground passenger transportation and courier/delivery services of over 28,000 full-time equivalent workers, additional local tax revenue of \$117 million, and additional state tax revenue of \$130 million***

	Economic Output	Labor Income	Other Sector FTE Employment	Local Taxes	State Taxes
Effect Associated with Rideshare Platforms (based on 2018 data)	\$729,024,142	\$538,206,401	1,719	\$9,567,970	\$23,555,703
Effect Associated with Delivery Platforms (based on 2021 forecasts)	\$258,309,191	\$178,859,443	720	\$3,901,850	\$8,210,798
Effect of Additional Demand for Restaurant Services Associated with the Growth of Delivery Platforms (based on 2021 forecasts)	\$3,163,970,014	\$1,027,559,312	26,272	\$103,711,158	\$98,144,201
<b>TOTAL ECONOMIC IMPACT</b>	<b>\$4,151,303,347</b>	<b>\$1,744,625,156</b>	<b>28,710</b>	<b>\$117,180,978</b>	<b>\$129,910,702</b>

Source: IMPLAN model; US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: Conservative case assumptions: (1) 68 percent of independent workers' earnings from rideshare and delivery platforms are incremental to the Massachusetts economy, (2) no indirect economic impacts for the use of rideshare platforms, (3) 30 percent of the indirect effects associated with delivery platforms are incremental, (4) 30 percent of the additional restaurant worker earnings associated with delivery platforms are incremental. See Section 12. Other Sector FTE Employment is employment outside of the ground passenger transportation services sector and outside of the courier/delivery services sector associated with the growth of rideshare and delivery platforms. For courier/delivery and restaurants, the analysis is based on forecasts for 2021. For rideshare, the analysis is based on 2018 data, which are the latest data available. However, given the decline in rideshare usage during the pandemic (see Section 9), the 2018 values for independent rideshare drivers' earnings likely represents the values for 2021, implying that there would have been no net growth in independent rideshare drivers' aggregate earnings between 2018 and 2021 because of the decline in rideshare demand during the pandemic.

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**EXHIBIT 4****Summary of county-level impacts associated with ridesharing and delivery platforms using conservative assumptions**

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Conservative case assumptions: (1) 68 percent of independent workers' earnings from rideshare and delivery platforms are incremental to the Massachusetts economy, (2) no indirect economic impacts for the use of rideshare platforms, (3) 30 percent of the indirect effects associated with delivery platforms are incremental, (4) 30 percent of the additional restaurant worker earnings associated with delivery platforms are incremental. See Section 12. The distribution of economic activity and local tax revenue is based on how much independent rideshare and delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

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26. Finally, we can consider the midpoint between the initial and conservative case assumptions. Since 2021 was a unique year that started with more unemployment than the economy has typically experienced during the last decade, it may be that the annual impact for future years associated with rideshare and delivery platforms will fall somewhere between the 2021 initial case and the 2021 conservative case discussed above. The reality is that there is a range of likely economic outcomes associated with rideshare and delivery platforms, depending on the overall macroeconomic environment in which they operate. These platforms will tend to have a bigger economic multiplier effect when there are more available workers who would otherwise not be working, and similarly, they will tend to have a smaller economic multiplier effect when the economy is already running at full potential. Exhibit 5 and Exhibit 6 show the economic impacts and their distribution throughout Massachusetts based on the average of the initial

and conservative case results, implying an annual increase in economic activity associated with rideshare and delivery platforms of \$8.3 billion or 1.3 percent of Massachusetts' GDP, as of 2021.

#### **EXHIBIT 5**

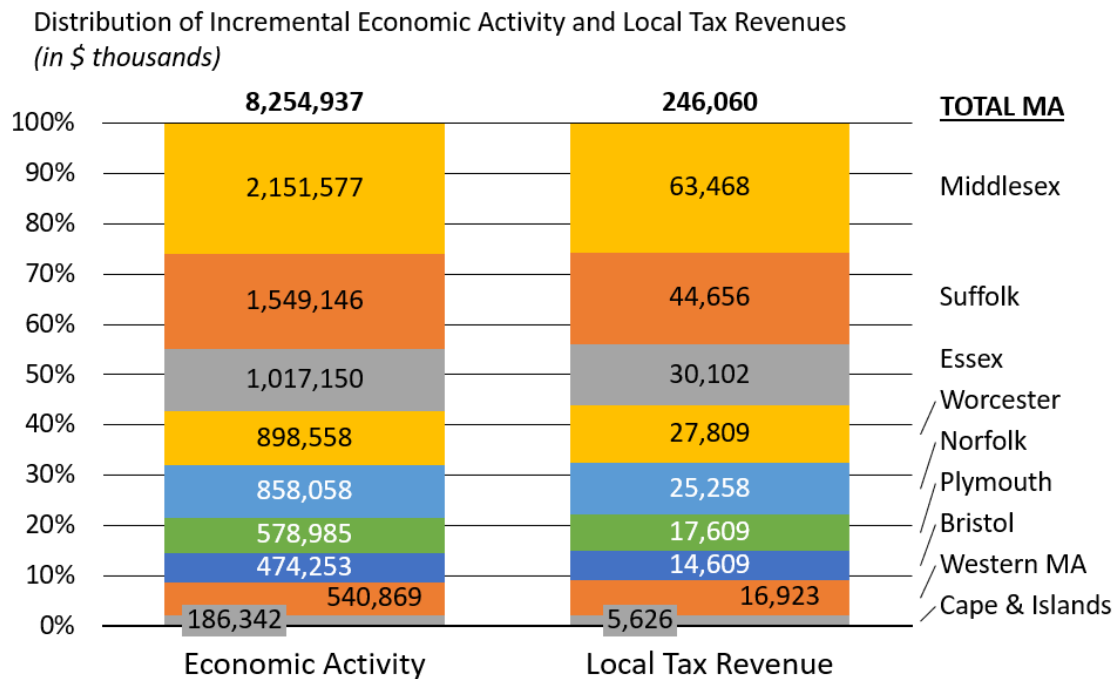
***Summary of economic impacts using the average of initial and conservative assumptions: in 2021, the growth of rideshare and delivery platforms in Massachusetts is associated with additional economic output of \$8.3 billion, including additional labor income of \$3.2 billion, additional employment in sectors outside of ground passenger transportation and courier/delivery services of over 60,000 full-time equivalent workers, additional local tax revenue of \$246 million, and additional state tax revenue of \$257 million***

	Economic Output	Labor Income	Other Sector FTE Employment	Local Taxes	State Taxes
Effect Associated with Rideshare Platforms (based on 2018 data)	\$1,048,658,967	\$720,532,405	2,850	\$15,684,817	\$33,468,945
Effect Associated with Delivery Platforms (based on 2021 forecasts)	\$351,009,613	\$233,159,368	1,070	\$5,667,995	\$11,082,957
Effect of Additional Demand for Restaurant Services Associated with the Growth of Delivery Platforms (based on 2021 forecasts)	\$6,855,268,363	\$2,226,378,509	56,922	\$224,707,508	\$212,645,768
<b>TOTAL ECONOMIC IMPACT</b>	<b>\$8,254,936,943</b>	<b>\$3,180,070,282</b>	<b>60,843</b>	<b>\$246,060,320</b>	<b>\$257,197,670</b>

Source: IMPLAN model; US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: Average of initial and conservative case results. Other Sector FTE Employment is employment outside of the ground passenger transportation services sector and outside of the courier/delivery services sector associated with the growth of rideshare and delivery platforms. For courier/delivery and restaurants, the analysis is based on forecasts for 2021. For rideshare, the analysis is based on 2018 data, which are the latest data available. However, given the decline in rideshare usage during the pandemic (see Section 9), the 2018 values for independent rideshare drivers' earnings likely represents the values for 2021, implying that there would have been no net growth in independent rideshare drivers' aggregate earnings between 2018 and 2021 because of the decline in rideshare demand during the pandemic.

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**EXHIBIT 6****Summary of county-level impacts associated with ridesharing and delivery platforms using the average of initial and conservative assumptions**

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Average of initial and conservative case results. The distribution of economic activity and local tax revenue is based on how much independent rideshare and delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

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27. In the remainder of this report, I describe in detail how I obtain these results for total economic impacts in Massachusetts and for county-level economic impacts associated with the growth of rideshare and delivery platforms.

#### **4. Platforms operating in Massachusetts have increased annual incomes in both the ground passenger transportation services sector and in the courier/delivery services sector**

28. When we think about the economic impact that rideshare and delivery platforms have on the Massachusetts economy, it is important to think about both how they have helped grow the overall economy and how this growth has been distributed among the population. The focus of this section is on the growth of the overall economy and specifically on the growth of the



ground passenger transportation services sector and courier/delivery services sector that occurred because of platforms.

***4.1. Ridesharing platforms operating in Massachusetts increased incomes in the ground passenger transportation services sector (taxis, limousine services, and ridesharing services) by an estimated \$625 million annually, as of 2018***

29. To assess the economic impact of rideshare platforms on ground passenger transportation services consisting of taxis, limousine services, and ridesharing services, I examine the growth in earnings for drivers employed by others and for independent drivers working in this sector between 2000 and 2018.<sup>6</sup>

30. The data for these analyses come from the US Census Bureau's County Business Patterns data and Nonemployee Statistics data, which are respectively based on the Business Register database and on tax data from the Internal Revenue Service. For each year and county, the Census Bureau collects data on the aggregate annual payroll of employees in a sector and publishes this information as part of the County Business Patterns data.<sup>7</sup> The Census Bureau also collects data on the aggregate earnings for those who are independent workers in a sector, based on their tax filings. In order to be counted, independent workers must have a minimum of \$1,000 in earnings in a sector in a year, which means the data for independent workers is likely

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<sup>6</sup> The North American Industry Classification System (NAICS) code I use for identifying this sector is 4853 "Taxi and Limousine Service." See NAICS Association, "NAICS Code Description, 4853 – Taxi and Limousine Service," available at <https://www.naics.com/naics-code-description/?code=4853>, accessed on March 13, 2022. Note that this NAICS code applies to workers employed by taxi/limousine companies and by independent workers who operate their own taxis/limousines or who use platforms to offer rideshares. This NAICS code does not apply to W-2 employees of rideshare platforms, who are classified under NAICS code 5415, "Computer Systems Design and Related Services". For definitions of "employed by others" and "independent" see fns. 7 and 8.

<sup>7</sup> The data for workers "employed by others" come from the US Census Bureau's County Business Patterns data. See US Census Bureau, "County Business Patterns (CBP), About this Program," available at: <https://www.census.gov/programs-surveys/cbp/about.html>, accessed on March 13, 2022. "County Business Patterns (CBP) is an annual series that provides subnational economic data by industry. This series includes the number of establishments, employment during the week of March 12, first quarter payroll, and annual payroll. This data is useful for studying the economic activity of small areas; analyzing economic changes over time; and as a benchmark for other statistical series, surveys, and databases between economic censuses. Businesses use the data for analyzing market potential, measuring the effectiveness of sales and advertising programs, setting sales quotas, and developing budgets. Government agencies use the data for administration and planning.... CBP basic data items are extracted from the Business Register (BR), a database of all known single and multi-establishment employer companies maintained and updated by the US Census Bureau. The BR contains the most complete, current, and consistent data for business establishments. The annual Report of Organization survey provides individual establishment data for multi-establishment companies. Data for single-establishment companies are obtained from various Census Bureau programs, such as the Economic Census, Annual Survey of Manufactures and Current Business Surveys, as well as from administrative record sources."

an underrepresentation of the full earnings of all independent workers in a sector.<sup>8</sup>

31. Using these data, I show in Exhibit 7 the total earnings for payroll employees and independent workers in the ground passenger transportation services sector in Massachusetts between 2000 and 2018.

32. In Exhibit 7, the gray bars at the bottom denote the annual payroll earnings of all payroll employees in the ground passenger transportation services sector in Massachusetts for each year. These numbers come directly from the US Census Bureau's County Business Patterns data. On top of the gray bars, up through 2011, I show dark orange bars to denote the earnings of independent workers in the ground passenger transportation services sector based on numbers that come directly from the US Census Bureau's Nonemployer Statistics data.

33. Rideshare platforms had their first full year of operation in Massachusetts in 2012.<sup>9</sup> From 2012 onwards, I estimate how much of the increase in independent worker earnings was associated with platforms and how much would have occurred anyway if platforms did not exist. To do this, I use the compound average annual growth rate of earnings for independent workers in this sector between 2000 and 2011, before platforms had a full year of operation in Massachusetts. This growth rate in earnings for independent workers in ground passenger transportation services is 6.9 percent per year. Based on this growth rate, I extrapolate what earnings would have been in aggregate for independent workers in ground passenger transportation services if platforms did not exist. I show this extrapolation in the light orange bars that are to the right of the dark orange bars. When focusing just on the orange bars, both the dark and light orange, this shows

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<sup>8</sup> The data for independent workers come from the US Census Bureau's Nonemployer Statistics. See US Census Bureau, "Nonemployer Statistics (NES), About this Program," available at: <https://www.census.gov/programs-surveys/nonemployer-statistics/about.html>, accessed on March 13, 2022. "Nonemployer Statistics (NES) is an annual series that provides subnational economic data for businesses that have no paid employees and are subject to federal income tax. The data consist of the number of businesses and total receipts by industry. Most nonemployers are self-employed individuals operating unincorporated businesses (known as sole proprietorships), which may or may not be the owner's principal source of income.... Statistics are available on businesses that have no paid employment or payroll, are subject to federal income taxes, and have receipts of \$1,000 or more (\$1 or more for the Construction sector)."

<sup>9</sup> For example, Uber's first full year of operation in Massachusetts was in 2012 (it began operating in Massachusetts in 2011) and Lyft began operating in 2013. See Boston.com, "The rise of Uber in Boston, by the numbers," available at: <https://www.boston.com/news/technology/2015/10/27/the-rise-of-uber-in-boston-by-the-numbers/>, October 27, 2015, accessed on March 13, 2022, and TechCrunch, "Lyft Hits The East Coast With A Launch In Boston, Its First Big Post-Funding Expansion City," May 31, 2013, available at <https://techcrunch.com/2013/05/31/lyft-boston/>, accessed on March 13, 2022.

the aggregate earnings for independent workers in the ground passenger transportation services sector before platforms existed and how their earnings would likely have grown if platforms had not started operating in Massachusetts.

34. In actuality, we observe in the Nonemployer Statistics data the aggregate earnings of independent workers in the ground passenger transportation services sector. The aggregate earnings that accrue to independent workers in each year that is above the forecast for what independent workers would have earned if platforms had not been operating in Massachusetts is shown in the yellow bars. In other words, the yellow bars measure how much additional earnings independent workers in the ground passenger transportation services sector likely receive because of rideshare platforms, assuming that the growth rate in their earnings had no reason to accelerate beyond the previous trend if platforms had not begun operating in Massachusetts.

35. By 2018, Exhibit 7 shows that rideshare platforms likely expanded the earnings of independent workers in the ground passenger transportation services sector by \$625 million. This is the latest year for which data for Massachusetts are available.<sup>10</sup> In other words, using prior trends, we can attribute \$625 million in additional earnings for independent workers in the ground passenger transportation services sector to the growth of rideshare platforms in Massachusetts. Since the data only capture independent workers who earned a minimum of \$1,000 from working in the ground passenger transportation services sector in a year and filed federal taxes on those earnings, this \$625 million value likely undercounts the additional earnings associated with the growth of platforms in Massachusetts.

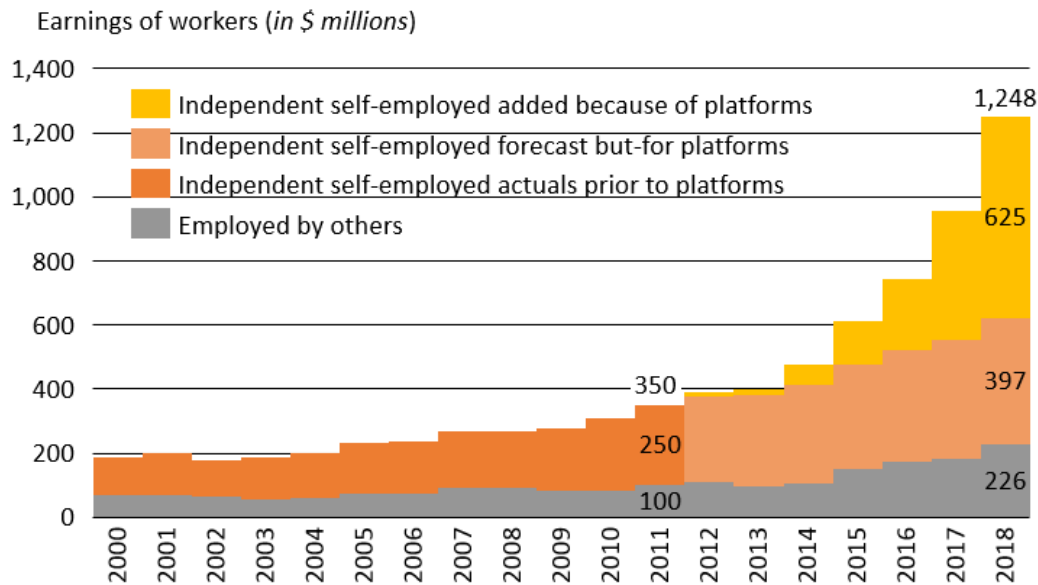
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<sup>10</sup> The 2019 Nonemployer Statistics release has been postponed due to limited availability of the source data. The US Census Bureau will post a revised release date as soon as one is available. See <https://www.census.gov/programs-surveys/nonemployer-statistics/data.html>.

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**EXHIBIT 7**

***Because of rideshare platforms, aggregate worker earnings in ground passenger transportation services in Massachusetts were \$625 million greater in 2018 than they likely would have been if rideshare platforms did not operate in Massachusetts***



Source: US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: The values for “employed by others” are actuals. The values for total self-employed (up to 2011: “independent self-employed actuals prior to platforms”; after 2011: “independent self-employed added because of platforms” + “independent self-employed forecast but-for platforms”) and are also actuals. The US census data do not disaggregate earnings by type of self-employed. For 2012-2018, the earnings of independent self-employed but-for platforms is a forecast based on the rate of growth of the actual number of independent self-employed prior to platforms based on 2000-2011 data. The earnings of independent self-employed added because of platforms is the residual, taking the total earnings of self-employed minus the forecasted earnings of independent self-employed that would have occurred if not for rideshare platforms.

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#### ***4.2. Delivery platforms operating in Massachusetts increased incomes in the courier/delivery services sector by an estimated \$33 million annually, as of 2018, even though they had only been operating on a larger scale in Massachusetts for less than two years***

36. We can similarly measure the likely impact that delivery platforms had on the aggregate earnings of independent workers in the courier/delivery services sector.<sup>11</sup>

37. The analyses and data are analogous to that for rideshare platforms discussed in Section 4.1, namely, we can use data from the US Census County

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<sup>11</sup> The NAICS code I use for identifying this sector is 492, which contains both “Couriers and Express Delivery Services” and “Local Messengers and Local Delivery.” See NAICS Association, “NAICS Code Description, 492 – Couriers and Messengers,” available at <https://www.naics.com/naics-code-description/?code=492>, accessed on March 13, 2022. Unfortunately, it is not possible with both the County Business Patterns data and the Nonemployer Statistics data to limit this sector only to “Local Messengers and Local Delivery.” This NAICS code does not apply to W-2 employees of delivery platforms, who are classified under NAICS code 5415, “Computer Systems Design and Related Services”.

Business Patterns data to measure annual payroll earnings for payroll employees in the courier/delivery services sector, and we can use the US Census Nonemployer Statistics data to measure annual aggregate earnings for independent workers in the courier/delivery services sector.

38. Delivery platforms began to operate on a larger scale in Massachusetts only in 2016.<sup>12</sup> Up until 2016, Exhibit 8 shows the aggregate annual payroll earnings of payroll employees (gray bars at the bottom) and the aggregate annual earnings for independent workers in the courier/delivery services sector prior to the growth of delivery platforms (dark orange bars). Using data on the growth of independent workers' earnings in courier/delivery services between 2000 and 2016,<sup>13</sup> I forecast what the growth of independent delivery/courier earnings would have been if delivery platforms had not entered the Massachusetts market (this is shown in light orange bars). The residual between the actual growth in earnings for independent workers in this sector and the predicted growth in earnings for independent workers if delivery platforms had not entered the Massachusetts market captures the effect that delivery platforms had in generating additional earnings for independent workers providing courier/delivery services (this is shown in the yellow bars).

39. As shown in Exhibit 8, by 2018, after only two full years in operation, delivery platforms likely increased aggregate earnings of independent workers in the delivery/courier services sector by \$33 million.

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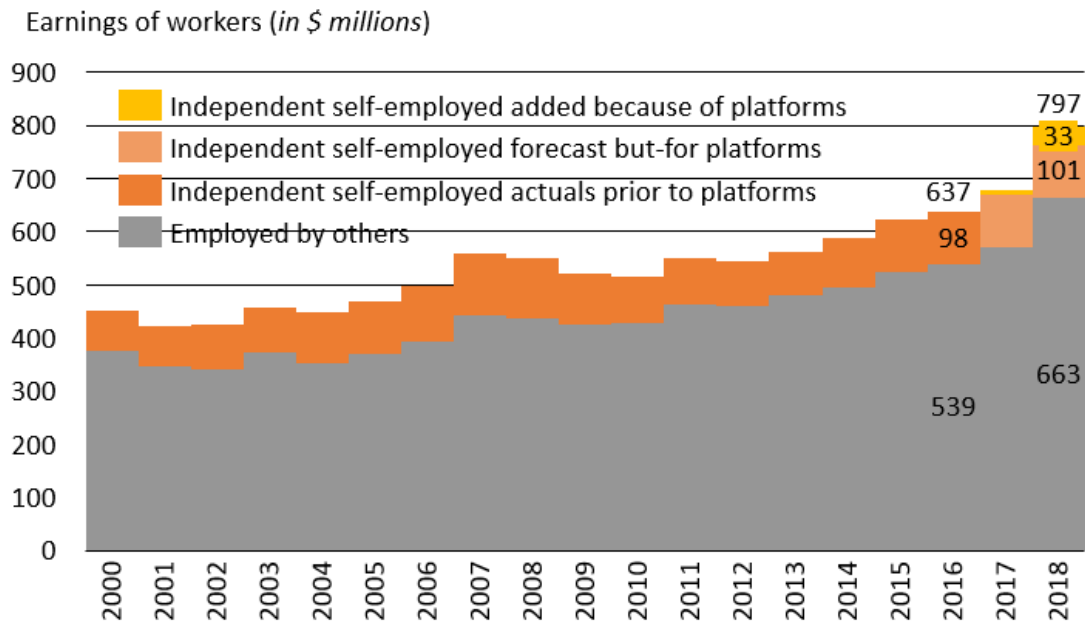
<sup>12</sup> For example, DoorDash officially launched in Boston in September of 2014 (see DoorDash, "The Red Shirts are in Boston!", September 30, 2014, available at: <https://medium.com/@DoorDash/the-red-shirts-are-in-boston-838b0ddf63de>, accessed on March 23, 2022). However, DoorDash and other delivery platforms did not achieve scale in Massachusetts until at least 2016. For example, DoorDash only launched in Cape Cod in 2019 (see Alex Newman, "DoorDash Launches On Cape Cod," May 17, 2019, available at: <https://patch.com/massachusetts/falmouth/doordash-launches-cape-cod>, accessed on March 23, 2022).

<sup>13</sup> This growth rate in earnings for independent workers providing courier/delivery services to consumers is 1.6 percent per year between 2000 and 2016.

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**EXHIBIT 8**

***Because of delivery platforms, aggregate worker earnings in the courier/delivery services sector in Massachusetts were \$33 million greater in 2018 than they likely would have been if delivery platforms did not operate in Massachusetts***



Source: US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: The values for “employed by others” are actuals. The values for total self-employed (up to 2016: “independent self-employed actuals prior to platforms”; after 2016: “independent self-employed added because of platforms” + “independent self-employed forecast but-for platforms”) and are also actuals. The US census data do not disaggregate earnings by type of self-employed. For 2017-2018, the earnings of independent self-employed but-for platforms is a forecast based on the rate of growth of the actual number of independent self-employed prior to platforms based on 2000-2016 data. The earnings of independent self-employed added because of platforms is the residual, taking the total earnings of self-employed minus the forecasted earnings of independent self-employed that would have occurred if not for delivery platforms.

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40. Because delivery platforms had only been in operation on a larger scale in Massachusetts for two full years in the available data, this \$33 million value in 2018 does not provide a good indication of what the likely effects of delivery platforms on independent workers’ earnings in the courier/delivery services sector is today. To estimate the impact in 2021, I discuss in Section 4.3 how I use data from the San Francisco Bay Area, where delivery platforms began operating on a larger scale in 2013, to forecast the effect that delivery platforms are likely to have in Massachusetts after being in operation for five years.

***4.3. Using pre-pandemic data from the San Francisco Bay Area, where delivery platforms have been operating since at least 2014, it is likely that delivery platforms in Massachusetts generated \$193 million in additional earnings in the courier/delivery services sector in 2021, and this value is likely larger once we consider the increased use of delivery platforms during the pandemic***

41. Delivery platforms began operating on a larger scale in the San Francisco Bay Area before they expanded to other parts of the country. To obtain a better sense of the amount of earnings that delivery platforms are likely to generate for independent workers in the courier/delivery services sector in Massachusetts after five years of operation, by 2021, we can look at the growth of this sector during the initial five years of operation of delivery platforms in the San Francisco Bay Area between 2014 and 2018.<sup>14</sup>

42. Following the same methodology as in Sections 4.1 and 4.2, I estimate the growth of independent workers' earnings in the courier/delivery services sector in the San Francisco Bay Area between 2014 and 2018 due to delivery platforms. To do this, I first calculate the growth rate of independent workers' earnings in the courier/delivery services sector prior to the emergence of delivery platforms in the San Francisco Bay Area between 2010 and 2013. This annual growth rate is 5.1 percent.<sup>15</sup> Using this growth rate, I forecast what independent workers' earnings in the courier/delivery services sector would have been without the emergence of delivery platforms. This forecast is shown in Exhibit 9 as the light orange bars. The difference between actual independent workers' earnings in the courier/delivery services sector and their predicted earnings but-for the emergence of platforms provides an estimate of the impact of delivery platforms on independent workers' earnings in this sector (this is shown in the yellow bars).

43. For our purposes, what is important in Exhibit 9 is the rate of growth of independent workers' earnings because of platforms between 2015 and 2016, between 2016 and 2017, and between 2017 and 2018. These are the third, fourth, and fifth years that delivery platforms were operating in the San

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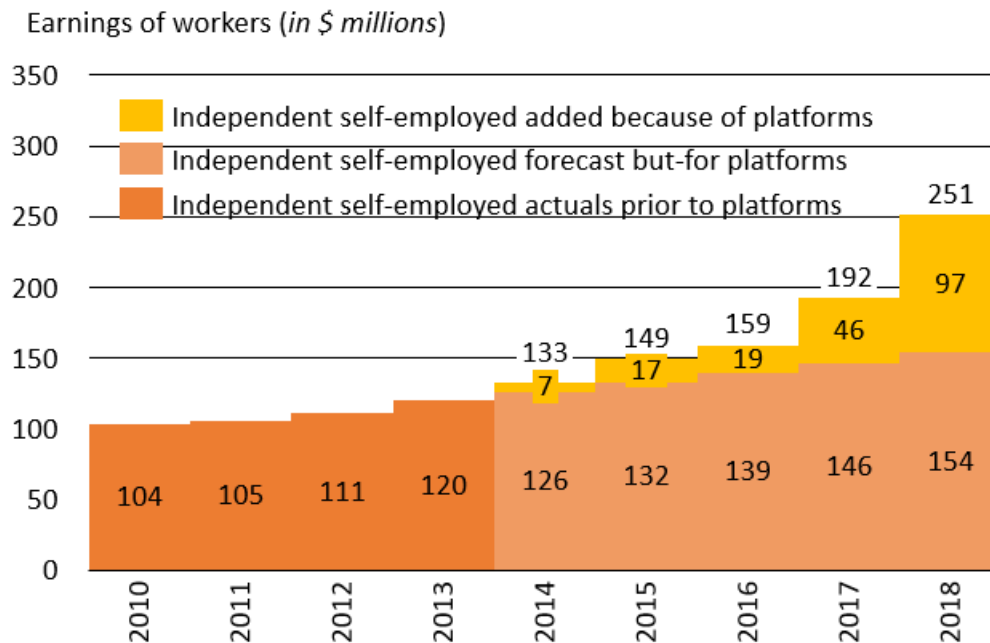
<sup>14</sup> I consider the San Francisco Bay Area to be the following counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. See Association of Bay Area Governments, Bay Area Census, accessed on March 6, 2022, available at: <http://www.bayareacensus.ca.gov/counties/counties.htm>. The San Francisco Bay Area has approximately similar population and land area as Massachusetts (approximately 7–8 million people and 7,000–8,000 square miles)

<sup>15</sup> If I had instead used the period 2000–2013 to calculate the annual growth rate, then the annual growth rate would have been 5.2 percent. I use the 2010–2013 period to calculate the growth rate because the county-level data is less reliable for the early 2000s.

Francisco Bay Area. In aggregate, independent workers' earnings in the courier/delivery services sector in the San Francisco Bay Area is estimated to have increased 14-fold because of delivery platforms in the five years between 2014 and 2018.

#### **EXHIBIT 9**

***Additional earnings of independent workers because of platforms in the courier/delivery services sector in the San Francisco Bay Area is estimated to have increased by 14 times in five years between 2014 and 2018***



Source: US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: The values for total self-employed (up to 2013: “independent self-employed actuals prior to platforms”; after 2013: “independent self-employed added because of platforms” + “independent self-employed forecast but-for platforms”) and are also actuals. The US census data do not disaggregate earnings by type of self-employed. For 2014-2018, the earnings of independent self-employed but-for platforms is a forecast based on the rate of growth of the actual number of independent self-employed prior to platforms based on 2010-2013 data. The earnings of independent self-employed added because of platforms is the residual, taking the total earnings of self-employed minus the forecasted earnings of independent self-employed that would have occurred if not for delivery platforms.

44. Using the growth rates calculated from Exhibit 9 for the third, fourth, and fifth years that delivery platforms were in operation in the San Francisco Bay Area, we can forecast what the earnings growth would have been in Massachusetts if we had data for 2019, 2020, and 2021, excluding any extraordinary growth due to the pandemic.

45. This forecast for the growth of independent workers' earnings in the courier/delivery services sector in Massachusetts due to delivery platforms is shown in Exhibit 10. Even without accounting for how the pandemic

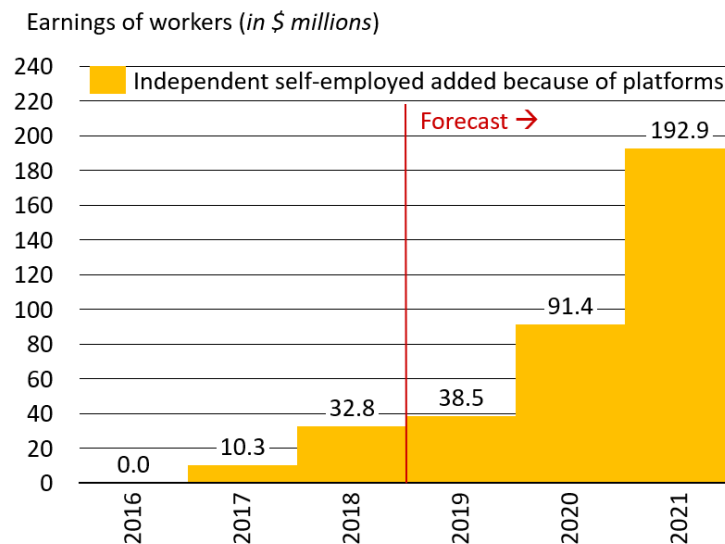


accelerated the use of delivery platforms (discussed below in Section 9), if the earnings of independent workers in the courier/delivery services sector in Massachusetts followed the same path as in the San Francisco Bay Area during the third, fourth, and fifth years of operation of delivery platforms, then the estimated earnings of independent workers in the courier/delivery services sector due to platforms in Massachusetts by 2021 is \$193 million. Again, this is using the growth rate of independent workers' earnings in the courier/delivery services sector in the San Francisco Bay Area, an area with approximately similar population size and geographic expanse as Massachusetts, between 2014 and 2018, and thus, it does not capture any potential effects of the pandemic in accelerating the widespread use of delivery platforms. This \$193 million estimate for independent workers' earnings in the courier/delivery services sector in Massachusetts in 2021 is therefore likely to be a conservative underestimate of the true number.

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**EXHIBIT 10**

***Massachusetts likely had an additional \$193 million in earnings for independent workers in the courier/delivery services sector in 2021 because of delivery platforms***



Source: US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: The values for 2017 and 2018 come from Exhibit 8. The values for 2019-2021 are based on the growth rates calculated from Exhibit 9 for the third, fourth, and fifth years that delivery platforms were in operation in the San Francisco Bay Area.

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**5. The “multiplier effect” as of 2018 from the additional income earned by independent workers providing ground passenger transportation services and courier/delivery services generates an additional \$2.1 billion annually to the Massachusetts economy and an additional \$69 million annually in state and local tax revenue**

46. The estimated increase in earnings for independent workers in the ground passenger transportation services sector in Massachusetts due to rideshare platforms in 2018 was \$625 million, as discussed in Section 4.1. For independent workers in the courier/delivery services sector in Massachusetts, the estimated increase in earnings due to delivery platforms in 2018 was \$33 million, as discussed in Section 4.2. Using these values, we can estimate a “multiplier effect” associated with increased earnings for independent rideshare drivers and delivery workers due to platforms.

47. The way the “multiplier effect” works is as follows:

- **“Direct Impact”**: Consumers spend money they otherwise would not have spent on services provided to them by independent rideshare and delivery platform workers, which increases the earnings of these independent workers. Conservatively, this additional labor income for independent rideshare and delivery workers corresponds to the additional output they are providing in the Massachusetts economy. This is the “direct effect,” which is the effect of additional consumer spending on the ground passenger transportation and courier/delivery services sectors that remains in Massachusetts. In this case, the additional output is the service that independent rideshare and delivery workers provide.
- **“Indirect Impact”**: A portion of the money that independent rideshare and delivery workers earn is used to purchase inputs. For example, independent rideshare drivers need to purchase gas, they need to purchase auto insurance, and they need to maintain their vehicles. The same holds for independent delivery workers, although for some, their mode of transportation may differ (i.e., they may use bicycles or motorcycles). While these are expenses for the independent rideshare and delivery workers, they are income for those from whom they purchase inputs. For example, when independent rideshare workers pay for auto maintenance, that increases the earnings of auto mechanics and increases output in the automobile maintenance sector. The “indirect impact” in Massachusetts is the effect of all the additional economic activity

generated by these purchases of inputs for the services provided by independent rideshare and delivery workers.

- **“Induced Impact”:** Finally, the additional income that independent rideshare and delivery workers earn, and the additional income that suppliers such as auto mechanics and gas station attendants earn from servicing independent rideshare and delivery workers, is used by all of these workers for general consumption of housing, healthcare, education, food, and other goods and services in the local areas where they live, work, and shop. In turn, this means that those who provide housing healthcare, food, and other goods and services all earn more as well, and they also spend more on general consumption within the local areas where they live, work, and shop.
- **“Multiplier Effect”:** The combination of the direct, indirect, and induced effects yields the “multiplier effect,” where every \$1 of additional spending on rideshare and delivery services generates more than \$1 in earnings and output for the Massachusetts economy.

48. I use the IMPLAN input-output model to calculate the economic impacts inclusive of “multiplier effects” generated from additional earnings estimated to accrue to independent rideshare and delivery workers because of platforms. IMPLAN is a leading provider of economic impact data and analytical applications.<sup>16</sup> IMPLAN utilizes an economic modeling technique called input-output analysis that has been widely used since at least the 1950s.<sup>17</sup> Input-output analysis is a type of applied economic analysis that tracks the interdependence among various producing and consuming industries of an economy. It measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands.<sup>18</sup> The methods used to produce IMPLAN’s economic data set and economic impact estimates have been widely published both in professional publications as well as peer-reviewed academic journals and are considered standard best practices in a wide variety of applied economic fields.<sup>19</sup>

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<sup>16</sup> IMPLAN, “About IMPLAN,” available at: <https://support.implan.com/hc/en-us/articles/360044985833-About-IMPLAN>, accessed on October 21, 2021.

<sup>17</sup> See, for example, A.A. Adams and I.G. Stewart, “Input-Output Analysis: An Application,” *The Economic Journal*, 66(263), pp. 442-454.

<sup>18</sup> IMPLAN, “About IMPLAN,” available at: <https://support.implan.com/hc/en-us/articles/360044985833-About-IMPLAN>, accessed on October 21, 2021.

<sup>19</sup> IMPLAN, “About IMPLAN,” available at: <https://support.implan.com/hc/en-us/articles/360044985833-About-IMPLAN>, accessed on October 21, 2021.

Importantly, the Massachusetts state government and other important institutions in Massachusetts rely on the IMPLAN input-output model for their own analyses.<sup>20</sup>

49. Using the IMPLAN input-output model, I show in Exhibit 11 the estimated impacts from additional independent rideshare driver earnings attributable to the use of rideshare platforms in 2018 in Massachusetts. Using the values estimated in Section 4.1, I model the direct effect as being an increase in independent rideshare workers' labor earnings of \$625 million in Massachusetts. I have conservatively constrained the model to assume the output generated in Massachusetts by independent rideshare drivers is equal to their earnings, even though, in actuality, the "output" generated by independent rideshare workers is a ride, which combines labor provided by the independent rideshare worker with inputs such as the use of a vehicle, gas, insurance, and maintenance.

50. The IMPLAN model generates the following results:

- Because of rideshare platforms, the estimated indirect effect of independent rideshare workers' purchases of inputs generates 756 full-time equivalent jobs, \$65 million in labor income, and \$172 million in output among the sectors where independent rideshare workers spend money in order to be able to provide rideshare services to consumers.
- Because of rideshare platforms, the estimated induced effect of independent rideshare workers and their suppliers spending their additional earnings on housing, healthcare, education, food, and other goods and services generates 3,226 full-time equivalent jobs, \$213 million in labor income, and \$571 million in output in the Massachusetts economy.

51. The total economic impact associated with rideshare platforms in 2018 in Massachusetts is an increase of approximately 4,000 full-time equivalent jobs in sectors outside of ground passenger transportation services, \$903

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<sup>20</sup> See, for example, ICF, "Massachusetts Commercial Food Waste Ban Economic Impact Analysis," Presented for the Massachusetts Department of Environmental Protection," October 2016, available at: <https://www.mass.gov/doc/massachusetts-commercial-food-waste-ban-economic-impact-analysis-o/download>, accessed on March 13, 2022; Boston University, "The Economic and Community Impacts of Boston University, Fiscal Year 2015," available at: [https://www.bu.edu/asir/files/2020/05/Final-BU-Economic-Impact-Report-5\\_15\\_17.pdf](https://www.bu.edu/asir/files/2020/05/Final-BU-Economic-Impact-Report-5_15_17.pdf), accessed on March 13, 2022.

million in additional labor income, and \$1.37 billion in additional economic output.

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**EXHIBIT 11**

***The “multiplier effect” associated with ridesharing platforms is estimated to have increased economic output in Massachusetts by \$1.37 billion in 2018 and generated an additional ~4,000 full-time equivalent jobs in sectors outside of ground passenger transportation services***

Impact	Employment	Labor Income	Output
1 - Direct	--	\$624,916,164	\$624,916,164
2 - Indirect	756	\$65,359,959	\$172,652,563
3 - Induced	3,226	\$212,582,287	\$570,725,065
TOTAL		\$902,858,410	\$1,368,293,792

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$624,916,164 in additional worker earnings in IMPLAN sector “418 – Transit and ground passenger transportation” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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52. Based on the additional labor income and economic output that rideshare platforms in Massachusetts are estimated to generate in 2018, the IMPLAN input-output model also calculates the associated additional tax revenue that state and local governments are likely to collect in Massachusetts because of the additional economic activity associated with rideshare platforms.<sup>21</sup> As I show in Exhibit 12, these values are \$21.8 million in additional local tax revenue and \$43.4 million in additional state tax revenue, for a total of \$65.2 million in additional tax revenue for state and local governments in Massachusetts in 2018 associated with the increased economic activity due to rideshare platforms.

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<sup>21</sup> Local tax revenue includes tax revenue collected by cities and townships, revenue collected by special districts, and revenue collected by county governments. Given the nature of Massachusetts local governments, most of the local tax revenue is attributable to cities and townships, but a small fraction is associated with special districts (e.g., business improvement districts, water districts) and county revenue collection.

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**EXHIBIT 12**

***The economic effects associated with ridesharing platforms are estimated to have increased tax revenue in Massachusetts by \$65.2 million in 2018***

Impact	Local	State	Total
1 - Direct	\$3,160,533	\$21,749,028	\$24,909,561
2 - Indirect	\$4,716,889	\$5,179,711	\$9,896,599
3 - Induced	\$13,924,242	\$16,453,448	\$30,377,689
TOTAL	\$21,801,663	\$43,382,187	\$65,183,850

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$624,916,164 in additional worker earnings in IMPLAN sector "418 – Transit and ground passenger transportation" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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53. Similarly, we can estimate the economic impacts associated with additional independent workers' earnings in the courier/delivery services sector in Massachusetts in 2018. Using the values estimated in Section 4.2, I model the direct effect as being an increase in independent delivery workers' earnings of \$33 million in Massachusetts. Again, I have conservatively constrained the model to assume the output generated in Massachusetts by independent delivery workers is equal to their earnings, even though, in actuality, the "output" generated by independent delivery workers is the delivery of an item, which combines labor provided by the delivery worker with inputs such as the use of a vehicle, gas, insurance, and maintenance. In the way I have modeled the economic impacts associated with independent delivery workers' output, I have not considered the economic impact of the production and consumption of the item that these workers are delivering. For example, I have not considered in the current analyses that when these workers deliver a restaurant meal, that likely also increases production of restaurant meals, which has an additional economic impact. I consider the economic impact of the items these workers are delivering in Section 7.

54. In Exhibit 13, I show the estimated direct, indirect, and induced effects associated with additional independent workers' earnings in the courier/delivery services sector because of delivery platforms. In addition to the \$33 million in labor earnings and output in the courier/delivery services sector, the economic impacts are an additional 65 full-time equivalent workers, \$4.4 million in labor income, and \$11.4 million in output in the sectors that supply inputs to independent delivery workers, and an additional 177 full-time equivalent workers, \$11.7 million in labor income, and \$31.3 million in output due to induced effects as independent delivery workers and

their suppliers spend their additional earnings on general consumption. In sum, the “multiplier effect” associated with delivery platforms is estimated to have increased labor income in Massachusetts by \$48.9 million, output by \$75.4 million, and full-time equivalent employment in sectors outside of courier/delivery services by 242 jobs.

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**EXHIBIT 13**

***The “multiplier effect” associated with delivery platforms is estimated to have increased economic output in Massachusetts by \$75.4 million in 2018 and generated an additional 242 full-time equivalent jobs in sectors outside of courier/delivery services***

Impact	Employment	Labor Income	Output
1 - Direct	--	\$32,788,458	\$32,788,458
2 - Indirect	65	\$4,432,852	\$11,369,885
3 - Induced	177	\$11,650,703	\$31,278,435
<b>TOTAL</b>		<b>\$48,872,013</b>	<b>\$75,436,778</b>

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author’s calculations

Notes: Based on an impulse of \$32,788,458 in additional worker earnings in IMPLAN sector “421 – Couriers and messengers” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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55. As I show in Exhibit 14, the additional income and economic output that delivery platforms are estimated to generate in 2018 yield an additional \$1.3 million in local taxes and \$2.4 million in state taxes, for a total increase in state and local tax revenue of \$3.6 million in Massachusetts in 2018.

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**EXHIBIT 14**

***The economic effects associated with delivery platforms are estimated to have increased tax revenue in Massachusetts by \$3.6 million in 2018***

Impact	Local	State	Total
1 - Direct	\$181,272	\$1,130,929	\$1,312,201
2 - Indirect	\$319,539	\$339,913	\$659,452
3 - Induced	\$763,094	\$901,718	\$1,664,812
<b>TOTAL</b>	<b>\$1,263,906</b>	<b>\$2,372,561</b>	<b>\$3,636,466</b>

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author’s calculations

Notes: Based on an impulse of \$32,788,458 in additional worker earnings in IMPLAN sector “421 – Couriers and messengers” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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56. To better understand the economic impacts associated with additional earnings for independent workers in the ground passenger transportation

services sector in Massachusetts in 2018, we can examine the estimated impacts by sector of the economy. Exhibit 15 shows these impacts based on the IMPLAN input-output model. The most impacted sector is the ground passenger transportation services sector, where economic activity is estimated to increase by \$627 million.<sup>22</sup> The ordering of impacts by sector then depends on the services and goods on which independent rideshare drivers are likely to spend their earnings, and on how the people that provide the services and goods to rideshare drivers in turn spend their money. From Exhibit 15, we can see that the top items that are produced within Massachusetts and on which independent rideshare drivers spend their money are housing, healthcare, financial services, insurance, restaurants, online shopping, and education.

57. It may seem surprising that certain sectors are not captured on the list presented in Exhibit 15. For example, gas is a substantial input into ground passenger transportation services, but its sector, the retail gas sector, is not among the top 30 impacted sectors in Massachusetts in 2018. The reason is that the economic output associated with retail gas sales in Massachusetts is only the services associated with the gas sales and not the gas itself. To expand on this point, the services associated with gas sales include the rent for the gas station, the labor of the gas attendant, the delivery of gas to the gas station, which happens locally, but since the gas that is sold at a gas station in Massachusetts is not produced locally, it does not count as contributing to additional economic output in Massachusetts. In this case, what counts is the additional labor and services required to sell gas to independent rideshare workers.

58. Thus, in Exhibit 15, the top 30 sectors shown do not necessarily reflect the top items on which independent rideshare drivers, their suppliers, and others in the economy spend their money, but rather, it reflects the top 30 sectors with the greatest contribution to local output within Massachusetts associated with the additional earnings of independent rideshare drivers. Almost by definition, this includes local transportation, local housing, local healthcare, local restaurants, and other local services, because these are produced locally, within Massachusetts.

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<sup>22</sup> This number is larger than the \$625 million calculated in Section 4.1 because it includes induced effects where higher incomes and output in the Massachusetts economy mean that people spend even more on ground passenger transportation services.



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**EXHIBIT 15*****Economic impacts from rideshare services for top 30 impacted sectors in Massachusetts in 2018***

Rank	Economic Sector	Increase in Economic Activity
1	Ground passenger transportation services	\$627,451,427
2	Owner-occupied dwellings	\$65,709,218
3	Monetary authorities and depository credit intermediation	\$55,500,483
4	Hospitals	\$43,731,254
5	Other real estate	\$34,940,852
6	Insurance carriers, except direct life	\$23,940,115
7	Insurance agencies, brokerages, and related activities	\$22,437,779
8	Offices of physicians	\$18,429,463
9	Tenant-occupied housing	\$18,276,555
10	Other financial investment activities	\$18,045,838
11	Full-service restaurants	\$14,152,080
12	Management of companies and enterprises	\$13,195,672
13	Employment services	\$11,330,282
14	Retail - Nonstore retailers	\$11,098,952
15	Limited-service restaurants	\$9,929,772
16	Internet publishing and broadcasting and web search portals	\$9,366,999
17	Legal services	\$9,006,848
18	Securities and commodity contracts intermediation and brokerage	\$8,852,759
19	Junior colleges, colleges, universities, and professional schools	\$8,323,894
20	Management consulting services	\$7,493,606
21	Retail - Food and beverage stores	\$7,447,261
22	Wireless telecommunications carriers (except satellite)	\$7,245,941
23	Nondepository credit intermediation and related activities	\$6,855,038
24	Services to buildings	\$6,699,792
25	Software publishers	\$6,681,177
26	Wholesale - Petroleum and petroleum products	\$6,676,157
27	Wholesale - Other nondurable goods merchant wholesalers	\$6,672,913
28	Automotive repair and maintenance, except car washes	\$6,630,788
29	Funds, trusts, and other financial vehicles	\$6,453,077
30	Nursing and community care facilities	\$6,336,595

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$624,916,164 in additional worker earnings in IMPLAN sector "418 – Transit and ground passenger transportation" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. This chart shows combined values for direct, indirect, and induced impacts.

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59. Exhibit 16 shows a similar ranking of the top 30 sectors impacted by independent delivery workers' earnings associated with the growth of delivery platforms in Massachusetts in 2018. Again, the ranking reflects the direct effects, indirect effects, and induced effects, with the largest impacted sector being couriers and messengers, due to the direct effects, followed by induced effects on housing and healthcare.

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**EXHIBIT 16****Economic impacts from courier/delivery services for top 30 impacted sectors in Massachusetts in 2018**

Rank	Economic Sector	Increase in Economic Activity
1	Couriers and messengers	\$33,272,450
2	Owner-occupied dwellings	\$3,601,247
3	Hospitals	\$2,396,871
4	Scenic and sightseeing transportation and support activities for transportation	\$2,224,409
5	Other real estate	\$2,080,989
6	Monetary authorities and depository credit intermediation	\$1,242,327
7	Insurance carriers, except direct life	\$1,222,819
8	Employment services	\$1,068,871
9	Management of companies and enterprises	\$1,043,845
10	Offices of physicians	\$1,010,006
11	Tenant-occupied housing	\$1,001,411
12	Other financial investment activities	\$789,411
13	All other food and drinking places	\$756,955
14	Full-service restaurants	\$745,507
15	Retail - Nonstore retailers	\$722,677
16	Limited-service restaurants	\$539,138
17	Internet publishing and broadcasting and web search portals	\$535,122
18	Legal services	\$532,480
19	Wholesale - Motor vehicle and motor vehicle parts and supplies	\$511,946
20	Wholesale - Petroleum and petroleum products	\$498,580
21	Insurance agencies, brokerages, and related activities	\$478,088
22	Junior colleges, colleges, universities, and professional schools	\$459,026
23	Wholesale - Other nondurable goods merchant wholesalers	\$437,364
24	Wholesale - Machinery, equipment, and supplies	\$414,751
25	Retail - Food and beverage stores	\$403,690
26	Wireless telecommunications carriers (except satellite)	\$368,529
27	Software publishers	\$366,350
28	Nursing and community care facilities	\$347,154
29	Management consulting services	\$346,417
30	Funds, trusts, and other financial vehicles	\$342,185

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$32,788,458 in additional worker earnings in IMPLAN sector "421 – Couriers and messengers" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. This chart shows combined values for direct, indirect, and induced impacts.

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60. Based on the counties where independent rideshare and delivery workers live, we can estimate the economic impacts of their additional earnings and spending by county in Massachusetts.<sup>23</sup> Exhibit 17 shows the distribution of economic activity and local tax revenue by county associated with additional

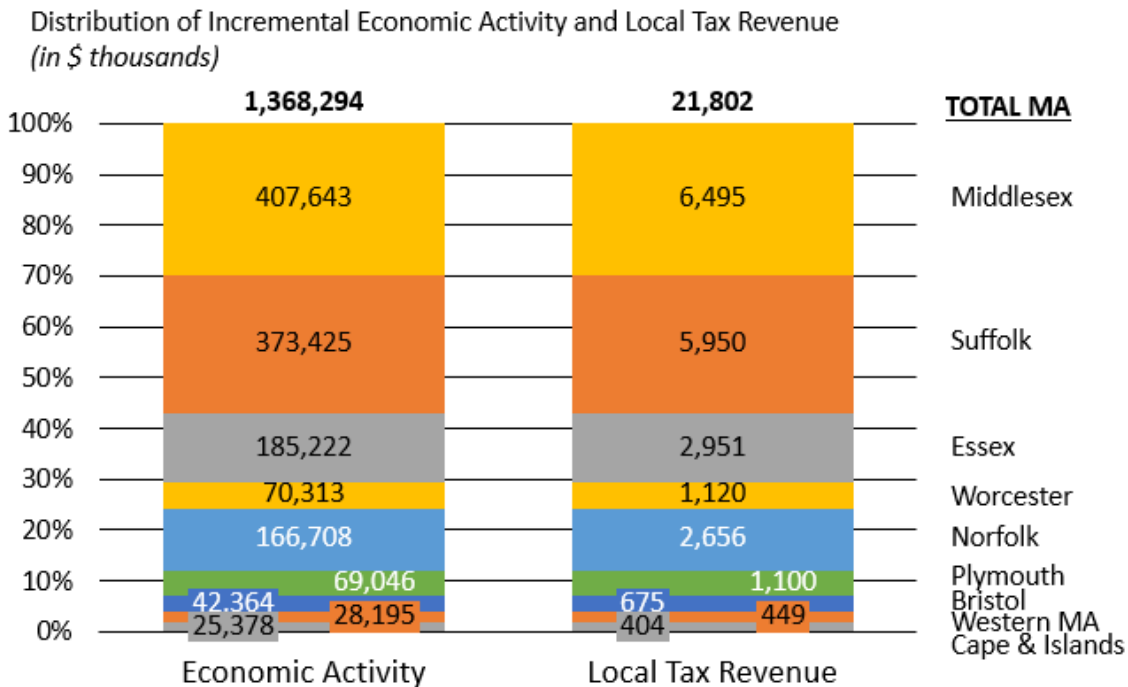
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<sup>23</sup> Because of the smaller magnitude of economic impacts in the counties of Western Massachusetts and the Cape and Islands, I combine the counties in these areas. The counties in Western Massachusetts are Berkshire, Franklin, Hampden, and Hampshire. The counties in the Cape and Islands are Barnstable, Dukes, and Nantucket.

independent rideshare drivers' earnings due to the growth by 2018 of rideshare platforms in Massachusetts.

**EXHIBIT 17**

***Distribution of estimated incremental economic activity and local taxes by county associated with the increase in ridesharing services due to platforms in 2018***



Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$624,916,164 in additional worker earnings in IMPLAN sector "418 – Transit and ground passenger transportation" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. The distribution of economic activity and local tax revenue is based on how much independent rideshare workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

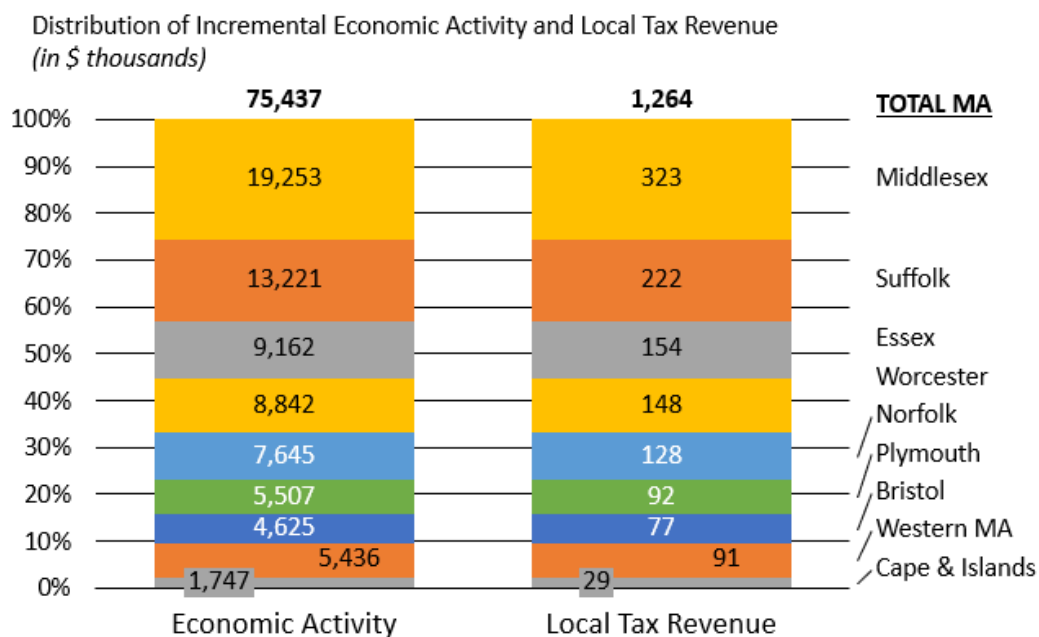
61. In Exhibit 17, the distribution of economic activity and local tax revenue is based on how much independent workers earn from working in the ground passenger transportation services sector and on where they live. The US Census Bureau provides this information according to these workers' tax filing data. For example, 29.8 percent of all the earnings of independent workers in the ground passenger transportation services sector in Massachusetts goes to independent workers who live in Middlesex County. Since these independent workers declare their address as being in Middlesex County when they file taxes, the assumption is that they consume housing services in Middlesex County, and they are likely to consume healthcare,

education, restaurant, auto repair, and other goods and services in Middlesex County as well.<sup>24</sup>

62. Exhibit 18 shows the distribution of economic activity and local tax revenue by county associated with additional independent delivery workers' earnings due to the growth by 2018 of delivery platforms in Massachusetts. The analysis is analogous to that for independent rideshare drivers, but with the distribution of economic activity and local tax revenue based on how much independent delivery workers earn from working in the courier/delivery services sector and on the counties where they live and are likely to spend their earnings.

#### **EXHIBIT 18**

***Distribution of estimated incremental economic activity and local taxes by county associated with the increase in courier/delivery services due to platforms in 2018***



Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$32,788,458 in additional worker earnings in IMPLAN sector "421 – Couriers and messengers" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. The distribution of economic activity and local tax revenue is based on how much independent delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

<sup>24</sup> It is possible that some of these local economic activity values may be less accurate when independent rideshare workers live and work in different areas. This is more likely to affect the "direct impact," since rideshare driving may occur outside of a worker's county of residence, but it is less likely to affect the "indirect impact" and "induced impact" since independent rideshare workers may be purchasing gas and having their cars serviced close to their homes, and since much of their spending on housing, education, healthcare, and food likely occurs near their homes.

**6. Based on forecasts for the continued growth of delivery platforms in Massachusetts, the “multiplier effect” for 2021 from the additional earnings in courier/delivery services is expected to generate an additional \$444 million to the Massachusetts economy and \$21.4 million in state and local tax revenue**

63. As discussed in Section 4.3, delivery platforms only began operating on a larger scale in Massachusetts in 2016, and the data only include two full years of delivery platform operations in the state, for 2017 and 2018. To better capture the likely economic impacts associated with delivery platforms by 2021, we can use the forecast for the additional earnings of independent workers in the courier/delivery services sector in Massachusetts in 2021 due to the growth of delivery platforms. Instead of using the value of \$33 million in additional earnings for independent delivery workers in 2018, we can use the IMPLAN input-output model to calculate the estimated economic effects associated with the \$193 million in additional independent delivery workers’ earnings forecasted for 2021 because of the growth of delivery platforms.

64. Exhibit 19 shows the estimated direct, indirect, induced, and total effects on labor income and output in Massachusetts and the indirect and induced effects on full-time equivalent employment outside of the courier/delivery services sector for 2021. The direct effect is an estimated additional \$193 million in labor income and output in the courier/delivery services sector, subject to the same caveats as mentioned above, that this likely underrepresents the true value of the additional economic output associated with independent delivery workers and the growth of delivery platforms during the pandemic. The indirect effect, representing the additional labor income and output of suppliers to independent delivery workers is \$26.1 million and \$68.9 million, respectively, with 381 additional full-time equivalent jobs generated among suppliers. The estimated induced effect, associated with increased consumption spending, is \$68.5 million in labor income, \$184 million in output, and 1,040 additional full-time equivalent workers in the sectors where independent delivery workers, their suppliers, and others in the economy are likely to spend their earnings. The total impact associated with delivery platforms is estimated to be an increase in labor income in Massachusetts of \$287 million, an increase in economic output in Massachusetts of \$444 million, and the creation of an additional 1,421 full-time equivalent jobs in sectors other than courier/delivery services in Massachusetts in 2021.

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**EXHIBIT 19**

***The “multiplier effect” associated with delivery platforms is estimated to have increased economic output in Massachusetts by \$444 million in 2021 and generated an additional 1,421 full-time equivalent jobs in sectors outside of courier/delivery services***

Impact	Employment	Labor Income	Output
1 - Direct	--	\$192,857,758	\$192,857,758
2 - Indirect	381	\$26,073,503	\$66,876,290
3 - Induced	1,040	\$68,528,030	\$183,975,987
TOTAL		\$287,459,292	\$443,710,036

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$192,857,758 in additional worker earnings in IMPLAN sector “421 – Couriers and messengers” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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65. Exhibit 20 shows the estimated impact on tax revenue when using the forecast of \$193 million for independent delivery workers' earnings associated with the growth of delivery platforms by 2021. The estimated impact associated with the growth of delivery platforms is an additional \$7.4 million in local tax revenue and \$14.0 million in state tax revenue, for a total impact on state and local tax revenue of \$21.4 million in 2021.

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**EXHIBIT 20**

***The economic effects associated with delivery platforms are estimated to have increased tax revenue in Massachusetts by \$21.4 million in 2021***

Impact	Local	State	Total
1 - Direct	\$1,066,221	\$6,651,990	\$7,718,211
2 - Indirect	\$1,879,491	\$1,999,328	\$3,878,819
3 - Induced	\$4,488,428	\$5,303,798	\$9,792,226
TOTAL	\$7,434,140	\$13,955,116	\$21,389,256

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$192,857,758 in additional worker earnings in IMPLAN sector “421 – Couriers and messengers” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings.

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66. Exhibit 21 provides the ranking of the top 30 sectors impacted by independent delivery workers' earnings associated with the forecasted growth of delivery platforms in Massachusetts by 2021. The ordering of sectors is the same as in Exhibit 16, but the values reflect the higher forecasted earnings of independent delivery workers in 2021 associated with the growth of delivery platforms.

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**EXHIBIT 21****Forecasted economic impacts from courier/delivery services for top 30 impacted sectors in Massachusetts in 2021**

Rank	Economic Sector	Increase in Economic Activity
1	Couriers and messengers	\$195,704,543
2	Owner-occupied dwellings	\$21,182,103
3	Hospitals	\$14,098,108
4	Scenic and sightseeing transportation and support activities for transportation	\$13,083,707
5	Other real estate	\$12,240,126
6	Monetary authorities and depository credit intermediation	\$7,307,215
7	Insurance carriers, except direct life	\$7,192,472
8	Employment services	\$6,286,969
9	Management of companies and enterprises	\$6,139,769
10	Offices of physicians	\$5,940,735
11	Tenant-occupied housing	\$5,890,180
12	Other financial investment activities	\$4,643,221
13	All other food and drinking places	\$4,452,318
14	Full-service restaurants	\$4,384,983
15	Retail - Nonstore retailers	\$4,250,700
16	Limited-service restaurants	\$3,171,145
17	Internet publishing and broadcasting and web search portals	\$3,147,526
18	Legal services	\$3,131,986
19	Wholesale - Motor vehicle and motor vehicle parts and supplies	\$3,011,207
20	Wholesale - Petroleum and petroleum products	\$2,932,590
21	Insurance agencies, brokerages, and related activities	\$2,812,058
22	Junior colleges, colleges, universities, and professional schools	\$2,699,936
23	Wholesale - Other nondurable goods merchant wholesalers	\$2,572,524
24	Wholesale - Machinery, equipment, and supplies	\$2,439,518
25	Retail - Food and beverage stores	\$2,374,455
26	Wireless telecommunications carriers (except satellite)	\$2,167,646
27	Software publishers	\$2,154,829
28	Nursing and community care facilities	\$2,041,920
29	Management consulting services	\$2,037,581
30	Funds, trusts, and other financial vehicles	\$2,012,694

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$192,857,758 in additional worker earnings in IMPLAN sector "421 – Couriers and messengers" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. This chart shows combined values for direct, indirect, and induced impacts.

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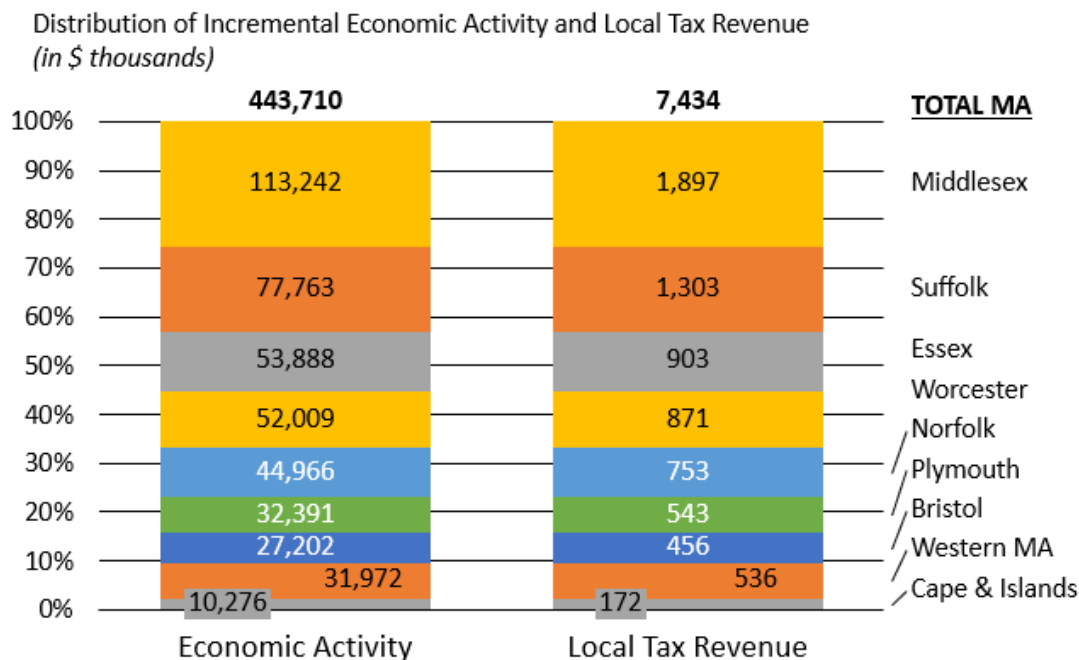
67. In Exhibit 22, I present the distribution of economic activity and local tax revenue by county associated with additional independent delivery workers' earnings of \$193 million due to the growth of delivery platforms in Massachusetts by 2021. The analysis is the same as in Exhibit 18, with the distribution of economic activity and local tax revenue based on how much independent delivery workers earn from working in the courier/delivery services sector and in the counties where they live and are likely to spend their earnings, but with the earnings based on a forecast of \$193 million in 2021 rather than \$33 million in 2018.



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**EXHIBIT 22**

***Distribution of forecasted incremental economic activity and local taxes by county associated with the increase in courier/delivery services due to platforms in 2021***



Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$192,857,758 in additional worker earnings in IMPLAN sector "421 – Couriers and messengers" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values, with the impulse sector output constrained to being equal to additional worker earnings. The distribution of economic activity and local tax revenue is based on how much independent delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

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## **7. The growth in independent delivery worker earnings is associated with higher earnings in the restaurant services industry in the US**

68. So far, we have not considered how the growth of delivery platforms may generate additional earnings and economic activity in the sectors that rely on deliveries to get their products to consumers. In this section, we focus on the correlation between independent delivery worker earnings and earnings in the restaurant service industry in the US, even though independent delivery workers may be delivering more than only restaurant meals.<sup>25</sup>

69. Using data from all counties in the US, I examine the change in independent delivery workers' earnings between 2016 and 2018 and the change in earnings for those working in the restaurant services industry, both payroll employees and independent workers, between 2016 and 2018.<sup>26</sup>



70. What we observe, as shown in Exhibit 23, is a positive relationship between growth in independent delivery worker earnings and growth in restaurant worker earnings.<sup>27</sup> This positive relationship is intuitive: greater ease of ordering and receiving restaurant meals through delivery platforms should mean both more earnings for independent delivery workers and more earnings for restaurant workers. This positive relationship is a correlation and not causation: it does not mean that higher earnings for independent delivery workers cause higher earnings for restaurant workers. It just means that the two tend to go together, with increases in earnings for independent delivery workers being correlated with increases in earnings for restaurant workers.

71. On average across all counties in the US, every \$1 million in additional earnings for independent delivery workers is associated with \$8.82 million in additional earnings for restaurant workers, including self-employed restaurant owners, between 2016 and 2018.

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<sup>25</sup> The North American Industry Classification System (NAICS) code I use for identifying this sector is 7225 “Restaurants and Other Eating Places.” See NAICS Association, “NAICS Code Description, 7225 – Restaurants and Other Eating Places,” available at <https://www.naics.com/naics-code-description/?code=7225>, accessed on March 13, 2022.

<sup>26</sup> The data for the restaurant services sector come from both the US Census Bureau’s County Business Patterns data and Nonemployer Statistics data for 2016 and 2018.

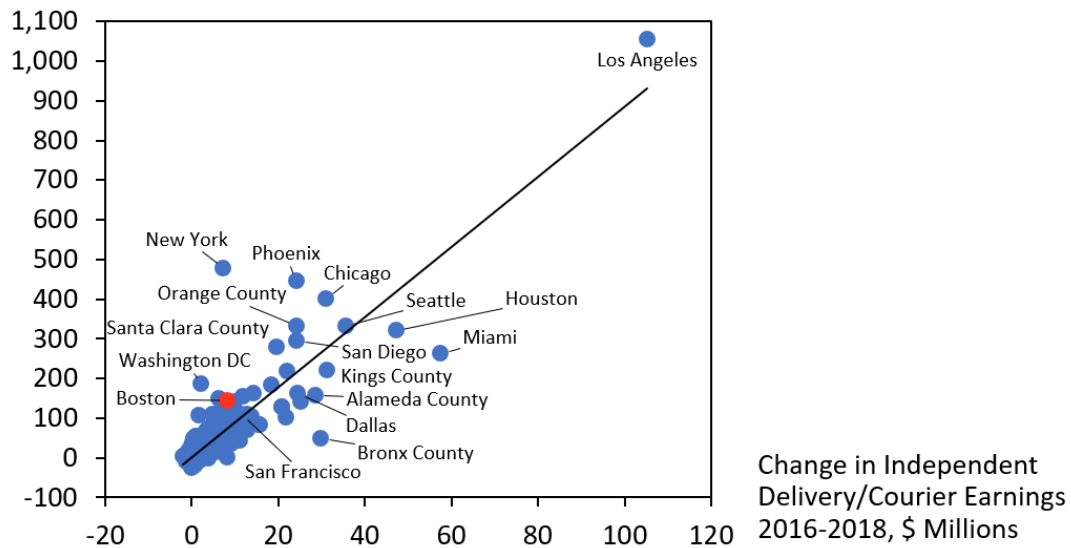
<sup>27</sup> If it were the case that the dominant effect was that independent delivery workers simply replaced delivery workers that restaurants employed directly, we would expect to see a negative relationship, where more independent delivery worker earnings are associated with lower restaurant worker earnings.

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**EXHIBIT 23**

**Larger increases in independent delivery worker earnings are associated with larger increases in earnings for restaurant workers between 2016 and 2018**

Change in Restaurant Earnings  
2016-2018, \$ Millions



Source: US Census Bureau, County Business Patterns and Nonemployee Statistics; authors calculations.

Notes: The trend line is:  $\text{Change in Restaurant Earnings} = 2.12 + 8.82 \times \text{Change in Independent Delivery/Courier Earnings}$ . R-squared = 0.79.

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**8. The growth of delivery platforms in Massachusetts is likely associated with an increase of \$1.7 billion in restaurant worker earnings in 2021, which implies an additional \$10.5 billion in 2021 to the Massachusetts economy and an additional \$673 million in 2021 in state and local tax revenue**

72. Using the relationship in Section 7, that an additional \$1 of independent delivery worker earnings between 2016 and 2018 is associated with an additional \$8.82 dollars of additional restaurant worker earnings during the same period, we can perform the following calculation for Massachusetts: if the growth in independent delivery worker earnings associated with delivery platforms in Massachusetts was \$193 million in 2021, then the growth in restaurant worker earnings associated with the growth of delivery platforms in Massachusetts was \$1.7 billion in 2021.<sup>28</sup>

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<sup>28</sup> This is simply  $\$192,857,758 \times 8.822 = \$1,701,391,139$ . This analysis is based on NAICS code 7225, which includes full-service restaurants, limited-service restaurants, cafeterias, grill buffets, buffets, and snack and nonalcoholic beverage bars.

73. We can use the IMPLAN input-output model to calculate the economic impacts associated with \$1.7 billion in additional restaurant worker earnings.<sup>29</sup> As shown in Exhibit 24, the direct impact is an additional 63,327 full-time equivalent workers, \$1.7 billion in labor income, and \$5.7 billion in output.<sup>30</sup> The indirect effect, associated with the suppliers of restaurants who provide inputs to production of restaurant services, is an additional 11,981 full-time equivalent workers, \$916 million in labor income, and \$2.7 billion in output. The induced effect, associated with general consumption due to the higher earnings of restaurant workers, their suppliers, and others in the economy, is to increase employment by 12,264 full-time equivalent workers, to increase labor income by \$808 million, and to increase output in Massachusetts by \$2.2 billion. In aggregate, the additional supply of restaurant services associated with delivery platforms is estimated to have increased total full-time equivalent employment in Massachusetts by 87,572 workers, total labor income by \$3.4 billion, and total output by \$10.5 billion in 2021.

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**EXHIBIT 24**

***The additional supply of restaurant services associated with delivery platforms is estimated to have increased total economic output in Massachusetts by \$10.5 billion in 2021, once we account for the “multiplier effect”***

Impact	Employment	Labor Income	Output
1 - Direct	63,327	\$1,701,391,139	\$5,704,257,590
2 - Indirect	11,981	\$915,598,564	\$2,673,197,949
3 - Induced	12,264	\$808,208,003	\$2,169,111,173
<b>TOTAL</b>	<b>87,572</b>	<b>\$3,425,197,706</b>	<b>\$10,546,566,712</b>

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author’s calculations

Notes: Based on an impulse of \$1,701,391,139 in additional worker earnings in IMPLAN sector “510 – Limited-service restaurants” for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values.

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74. Exhibit 25 shows the impact on tax revenue due to additional restaurant services associated with delivery platforms in Massachusetts in 2021. The estimated impact is an additional \$346 million in local tax revenue and \$327

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<sup>29</sup> I model these impacts assuming that the increase in demand for restaurant services resembles the increase in demand that would occur at “limited service restaurants” where the provision of restaurant meals is less labor intensive. This assumption is because food delivery would not require the services of hosts, servers, and bartenders but more so the services of cooks and therefore more closely resembles the production processes of limited service restaurants.

<sup>30</sup> In this case, I do not constrain the output to be the same as the labor income since the production of restaurant meals also involves inputs such as food, land, and utilities, for which much of the value may be produced locally and would contribute to economic activity in Massachusetts. The IMPLAN model suggests that labor accounts for approximately 30 percent of the value of restaurant meals: \$1.7 million / \$5.7 million = 0.30.

million in state tax revenue, for a total impact on state and local tax revenue of \$673 million in 2021.

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**EXHIBIT 25**

***The economic effects from additional restaurant services associated with delivery platforms is estimated to have increased tax revenue in Massachusetts by \$673 million in 2021***

Impact	Local	State	Total
1 - Direct	\$250,280,699	\$204,620,396	\$454,901,095
2 - Indirect	\$42,530,730	\$60,005,501	\$102,536,231
3 - Induced	\$52,892,430	\$62,521,439	\$115,413,868
	\$345,703,859	\$327,147,336	\$672,851,195

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$1,701,391,139 in additional worker earnings in IMPLAN sector "510 – Limited-service restaurants" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values.

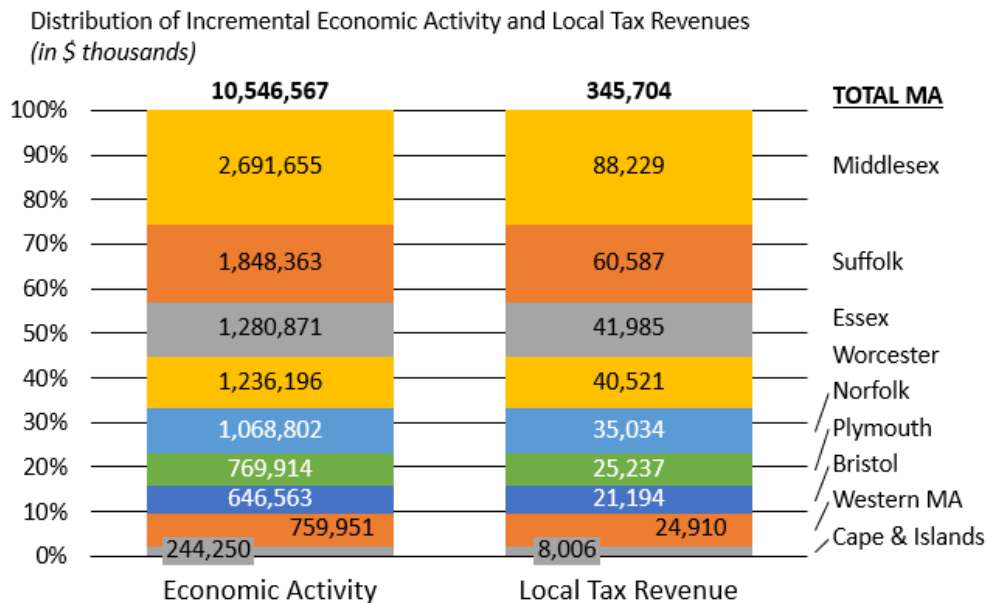
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75. As before, we can calculate the distribution of incremental economic activity and local tax revenue by county in Massachusetts because of the additional restaurant services associated with the growth of delivery platforms. I show this county-level analysis in Exhibit 26. The assumption in this analysis is that independent delivery workers deliver from restaurants in the counties where they live, and thus the additional restaurant services they help generate is also in the counties where they live.<sup>31</sup>

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<sup>31</sup> In the data, it is only possible to observe where workers live, based on tax filings, and not where they work. The assumption in this case is that independent delivery workers are making deliveries from restaurants in the counties where they live.

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**EXHIBIT 26*****Distribution of forecasted incremental economic activity and local taxes by county due to additional restaurant services associated with increased courier/delivery services due to platforms in 2021***

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Based on an impulse of \$1,701,391,139 in additional worker earnings in IMPLAN sector "510 – Limited-service restaurants" for Massachusetts, using the 2019 data year and 2021 inflation-adjusted dollar values. The distribution of economic activity and local tax revenue is based on how much independent delivery workers earn and on where they live. The assumption in this analysis is that independent delivery workers deliver from restaurants in the counties where they live, and thus the additional restaurant services and additional earnings for restaurant workers that they help generate are also in the counties where they live. The US Census Bureau provides information on how much independent delivery workers earn and on where they live at the county level based on these workers' tax filing data. In the data, it is only possible to observe where workers live, based on their tax filings, and not where they work.

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**9. The courier/delivery services sector has grown faster during the pandemic, which means the forecasts for the economic impacts of delivery platforms are likely underestimates of their true impacts in 2021**

76. The economic impacts of delivery platforms presented in the preceding sections have abstracted from the events of the pandemic. From the County Business Patterns and Nonemployer Statistics data, we are limited in the timeframe we can analyze.

77. However, using payroll data and aggregate US data, rather than state or county-level data, we can assess how the courier/delivery services sector grew during the pandemic. During the pandemic, the sector that gained the most payroll jobs was transportation and warehousing, as I show in Exhibit 27. Within transportation and warehousing, one of the largest gains was due

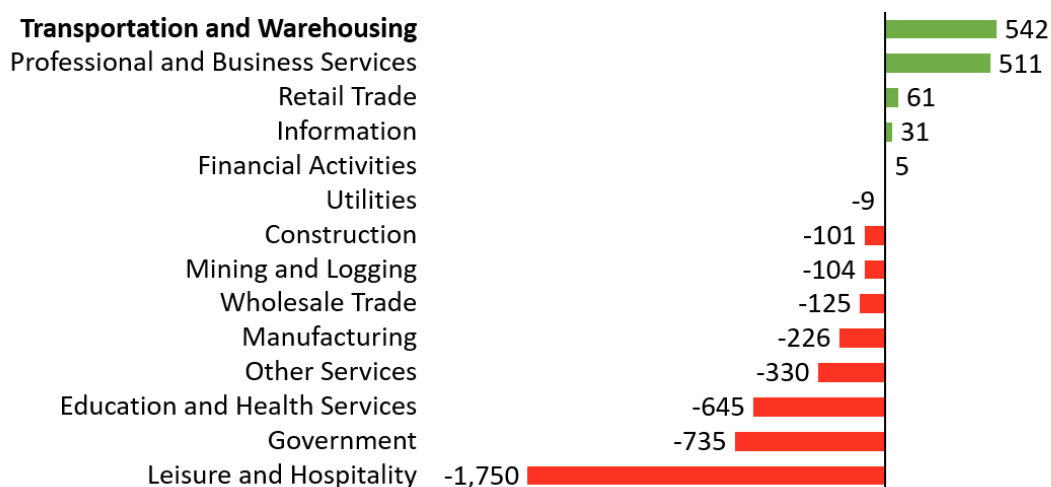
to courier and messenger services. Between February 2020 and January 2022, the US economy added 236,000 payroll jobs in the courier and messenger services sector, as I show in Exhibit 28.<sup>32</sup> It is important to note that this is the number of payroll jobs for courier and messenger services and does not include services performed through platforms, where the worker is a self-employed independent worker rather than a payroll employee.

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**EXHIBIT 27**

***During the pandemic, the sector that gained the most payroll jobs was transportation and warehousing, which includes courier and messenger services***

Change in number of workers, Feb 2020 – Jan 2022 (in thousands)



Source: US Department of Labor, Bureau of Labor Statistics, The Employment Situation – January 2022, Released February 4, 2022, available at: [https://www.bls.gov/news.release/archives/empsit\\_02042022.htm](https://www.bls.gov/news.release/archives/empsit_02042022.htm); US Department of Labor, Bureau of Labor Statistics, The Employment Situation – February 2020, Released March 6, 2020, available at: [https://www.bls.gov/news.release/archives/empsit\\_03062020.htm](https://www.bls.gov/news.release/archives/empsit_03062020.htm)

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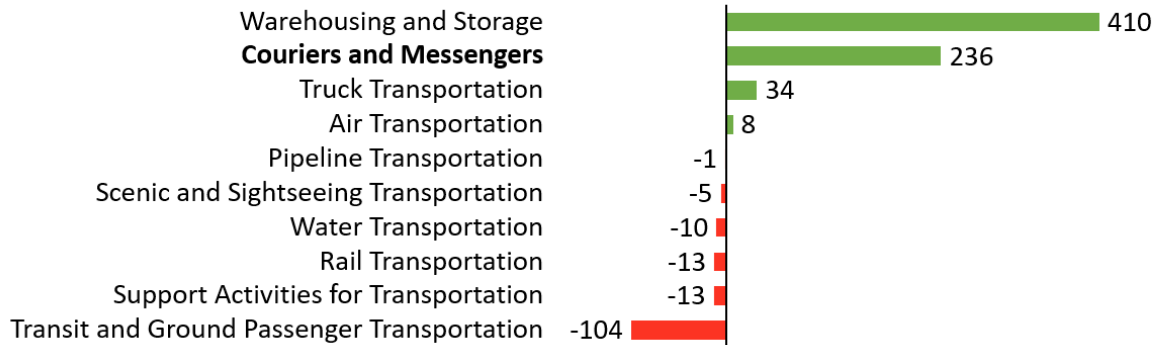
<sup>32</sup> US Department of Labor, Bureau of Labor Statistics, The Employment Situation – January 2022, Released February 4, 2022, available at: [https://www.bls.gov/news.release/archives/empsit\\_02042022.htm](https://www.bls.gov/news.release/archives/empsit_02042022.htm)

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**EXHIBIT 28**

***During the pandemic, the US economy added 236,000 payroll jobs in the courier and messenger services sector***

Change in number of workers in “Transportation and Warehousing”, Feb 2020 – Jan 2022 (*in thousands*)



Source: US Department of Labor, Bureau of Labor Statistics, The Employment Situation – January 2022, Released February 4, 2022, available at: [https://www.bls.gov/news.release/archives/empsit\\_02042022.htm](https://www.bls.gov/news.release/archives/empsit_02042022.htm); US Department of Labor, Bureau of Labor Statistics, The Employment Situation – February 2020, Released March 6, 2020, available at: [https://www.bls.gov/news.release/archives/empsit\\_03062020.htm](https://www.bls.gov/news.release/archives/empsit_03062020.htm)

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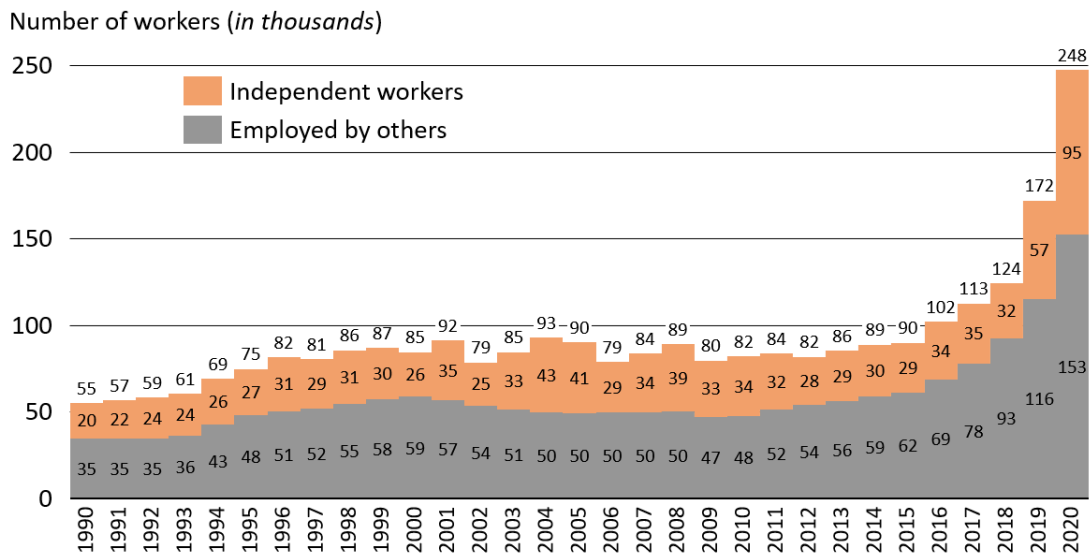
78. While the data from the Bureau of Labor Statistics do not allow us to explicitly see the growth of courier and messenger services due to platforms since 2020, we can estimate this growth using past relationships between the number of couriers and messengers who have been engaged as independent workers and the number who are payroll employees.

79. Exhibit 29 shows the trend in the number of workers in the local messenger and local delivery services sector, including wage and salary workers and self-employed independent workers. The data are only available through 2020. Note the rapid increase in the overall number of workers in local messengers and local delivery services starting in 2015, as the use of local delivery platforms becomes more widespread. The number of independent local messengers and delivery workers nearly doubled between 2018 and 2019 and increased by over 60 percent between 2019 and 2020. For local messenger and delivery workers employed by firms, the rate of increase was 25 percent between 2018 and 2019 and 32 percent between 2019 and 2020.

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**EXHIBIT 29**

***Much of the growth of local messenger and local delivery services in the US – focusing specifically on messenger and delivery services within cities – has been due to independent workers and has coincided with the growth of delivery platforms***



Source: St. Louis Federal Reserve Bank, FRED, Series IPUIN4922W200000000 and US Bureau of Labor Statistics, Series CEU4349220001, 1990–2020.

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80. Given that courier and messenger services were one of the fastest growing sectors of the economy during the pandemic, and given the strong relationship between the growth in courier and messenger payroll jobs and the growth in independent courier and messenger workers shown in Exhibit 29, it is likely that the values presented in the preceding sections based on the growth in earnings for independent delivery workers through 2021 in Massachusetts substantially understates the true growth and economic impacts associated with delivery platforms.

81. As discussed in Section 4.3, the forecast for the first five years of growth in independent worker earnings on delivery platforms in Massachusetts, between 2017 and 2021, is based on the actual growth in independent worker earnings on delivery platforms in the San Francisco Bay Area between 2014 and 2018. This means that the 2014–2018 data used for creating the forecast do not capture the acceleration in the use of delivery platforms that occurred during the pandemic.



82. The courier and delivery services sector was one of the fastest growing sectors of the economy between 2020 and 2022. When we consider the likely effects of the pandemic on accelerating the use of delivery platforms, the economic impacts presented in the preceding sections likely understate the true economic impacts attributable to delivery platforms in Massachusetts in 2021.

## **10. Platforms that offer opportunities for independent work have helped people smooth income and consumption in response to economic shocks such as unemployment**

83. Several studies have analyzed who uses platforms for independent work. The focus of these studies has mostly been on ridesharing platforms, since these have been in existence for a longer period of time and there are more available data. When we examine who uses platforms to provide rideshare services, the answer is that independent rideshare drivers are more representative of the general population compared to drivers who had worked in ground passenger transportation services prior to rideshare platforms.<sup>33</sup>

84. Low barriers to entry mean that for a majority of eligible people, providing rideshare services as an independent worker is an accessible way to earn additional income. This means the age, education, gender, and ethnic composition of independent rideshare drivers are more similar to the general working-age population than is the case for taxi drivers prior to the availability of rideshare platforms.<sup>34</sup> There is one exception: compared to the general population, rideshare drivers are more likely to have experienced a negative economic shock, such as experiencing a loss of income or incurring more debt, which may be a motivating factor in seeking alternative sources of earnings.

85. A 2019 study by the JP Morgan Chase Institute, using data from 39 million Chase checking accounts between 2012 and 2018, found that income and cash balances declined by around 10 percent in the two months leading up to a family member beginning to work with an online platform like Uber

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<sup>33</sup> Jonathan V. Hall and Alan B. Krueger, "An Analysis of the Labor Market for Uber's Driver-Partners in the United States," NBER Working Paper No. 22843, November 2016, available at: <https://www.nber.org/papers/w22843>, (hereafter, "Hall and Krueger, 2016").

<sup>34</sup> Hall and Krueger, 2016.

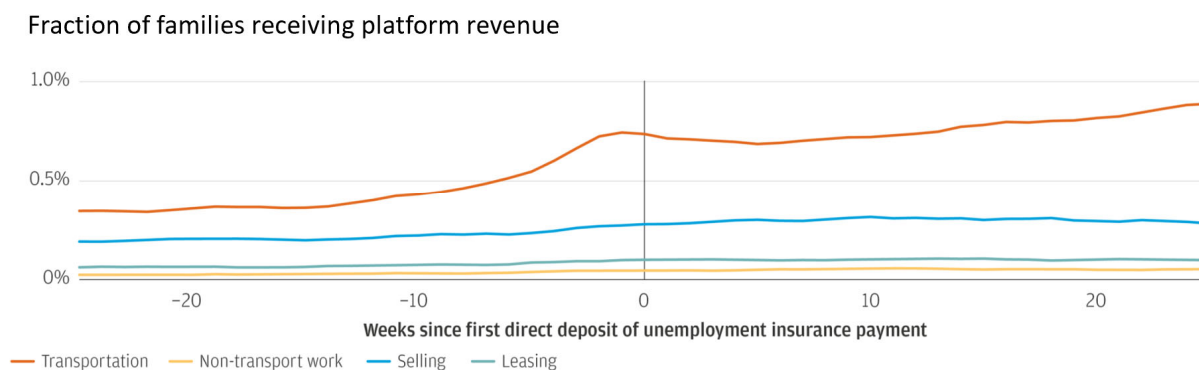
and Lyft.<sup>35</sup> Once a family member began working as an independent driver on these platforms, the family's balances in their Chase checking accounts began recovering.

86. Unemployment events appear to trigger changes in platform participation. Right before receiving unemployment benefits, the share of families participating in online platforms nearly doubles, with the increase almost entirely in platforms like Uber and Lyft, rather than on other platforms like eBay, Etsy, and Airbnb (see Exhibit 30). This preference for rideshare platforms is likely because barriers to entry on these platforms are lower than on other platforms, which may require more specialized skills or greater capital investment. The share of families experiencing unemployment that turn to online platforms is small, less than 1 percent of all families with unemployed workers, but for those families, the additional \$150-\$250 per week in earnings through platforms helps smooth their income and consumption, and their consumption helps generate additional economic benefits for the communities where they live, as discussed previously in this report.

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### **EXHIBIT 30**

#### ***Unemployment triggers participation in rideshare platforms like Uber and Lyft***



Source: Diana Farrell, Fiona Greig, and Amar Hamoudi, "Bridging the Gap: How Families Use the Online Platform Economy to Manage their Cash Flow," JP Morgan Chase & Co. Institute, October, 2019, available at: <https://institute.jpmorganchase.com/institute/research/labor-markets/report-bridging-the-gap#finding-1>.

Notes: Job loss sample of 170,000 families receiving their first direct deposit from public unemployment insurance (UI) system, after at least six months without UI deposits.

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<sup>35</sup> Diana Farrell, Fiona Greig, and Amar Hamoudi, "Bridging the Gap: How Families Use the Online Platform Economy to Manage their Cash Flow," JP Morgan Chase & Co. Institute, October, 2019, available at: <https://institute.jpmorganchase.com/institute/research/labor-markets/report-bridging-the-gap#finding-1>.

87. While the focus of these studies has been on rideshare platforms given that the use of rideshare platforms was more widespread at the time these studies were conducted, delivery platforms now offer a similar ease of entry for workers, with low entry barriers and low start-up costs relative to other platforms like eBay, Etsy, and Airbnb. More recent data, given the growth of independent work through delivery platforms, would likely indicate that these also have a sizable effect on helping workers smooth income and consumption during economic shocks such as unemployment.

## **11. Rideshare and delivery platforms provide workers with flexibility and independence**

88. Surveys of drivers that use the Uber and Lyft platforms indicate that the majority drive a limited number of hours, have jobs outside of platform work, drive occasionally to earn supplemental income, use multiple platforms to find work opportunities, and need a flexible schedule (see Exhibit 31). Based on a 2015 survey, for weeks in which they drove, 53 percent of drivers using the Uber platform worked fewer than 16 hours per week, 30 percent worked between 16 and 35 hours, and 17 percent worked more than 35 hours.<sup>36</sup> The reason the majority of drivers only drive a limited number of hours on the Uber platform is two-fold. First, most had jobs outside of platform work. Based on a 2020 survey, prior to the pandemic, 84 percent of drivers had jobs outside of platform work and reported driving only a limited number of hours on platforms.<sup>37</sup> Second, even within rideshare and delivery driving, drivers were not exclusive to one platform. Over 80 percent of drivers used more than two platforms.

89. Prior to the pandemic, 74 percent of rideshare drivers said they drove to earn supplemental income, rather than as a primary source of income. During the pandemic, however, this number dropped to 52 percent as the unemployment rate increased and independent rideshare and delivery driving became the primary source of income for 48 percent of drivers. This reinforces the notion that these platforms help smooth unemployment

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<sup>36</sup> Hall and Krueger, 2016.

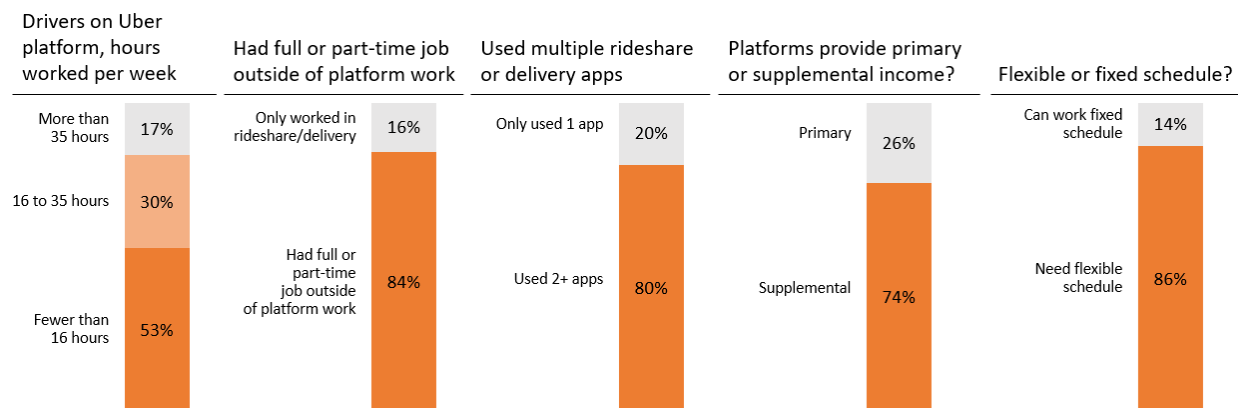
<sup>37</sup> Edelman Intelligence, “CA App-Based Driver Survey,” July 2020, available at: <https://cadriversurvey-jge.nationbuilder.com/>, accessed on March 25, 2022. This is an online survey conducted by Edelman Intelligence, interviewing 718 California app-based rideshare and food delivery drivers who had driven with any rideshare or food delivery app within the past year. Data collected between May 19 and June 1, 2020. Margin of error of +/- 3.7 percentage points. Survey commissioned by Uber.

shocks by providing alternate sources of earnings. Indeed, 25 percent of drivers said they had recently lost a full or part-time job.

90. Since the majority of rideshare and delivery drivers have jobs outside of platform work and drive to earn supplemental income, it is not surprising that they require flexibility: 86 percent said they need a flexible schedule, 71 percent said their schedule changes week-to-week, and 68 percent said they would not continue driving if they were required to work a fixed shift.

### EXHIBIT 31

***The majority of drivers using the Uber and Lyft platforms drive a limited number of hours, have jobs outside of platform work, drive occasionally to earn supplemental income, use multiple platforms to find work opportunities, and need a flexible schedule***



Source: Hall and Krueger, 2016, and Edelman Intelligence, “CA App-Based Driver Survey,” July 2020, available at: <https://cadriversurvey-jge.nationbuilder.com/>, accessed on March 25, 2022.

Notes: Data for “Uber drivers, hours worked per week” are from Hall and Krueger, 2016. Data for remaining categories are from Edelman Intelligence, CA App-Based Driver Survey, July 2020.

91. When we compare the hours people typically spend working, based on data from the American Time Use Survey,<sup>38</sup> versus the hours independent drivers who use the Uber platform tend to work, based on proprietary Uber data, we see that independent drivers who use the Uber platform tend to work later on weekday evenings, later on Friday nights, and on weekends (see Exhibit 32). In contrast to the general population, which tends to work Monday through Friday, 8am–6pm, independent drivers who use the Uber platform tend to work more during hours when jobs with regular schedules are less available.

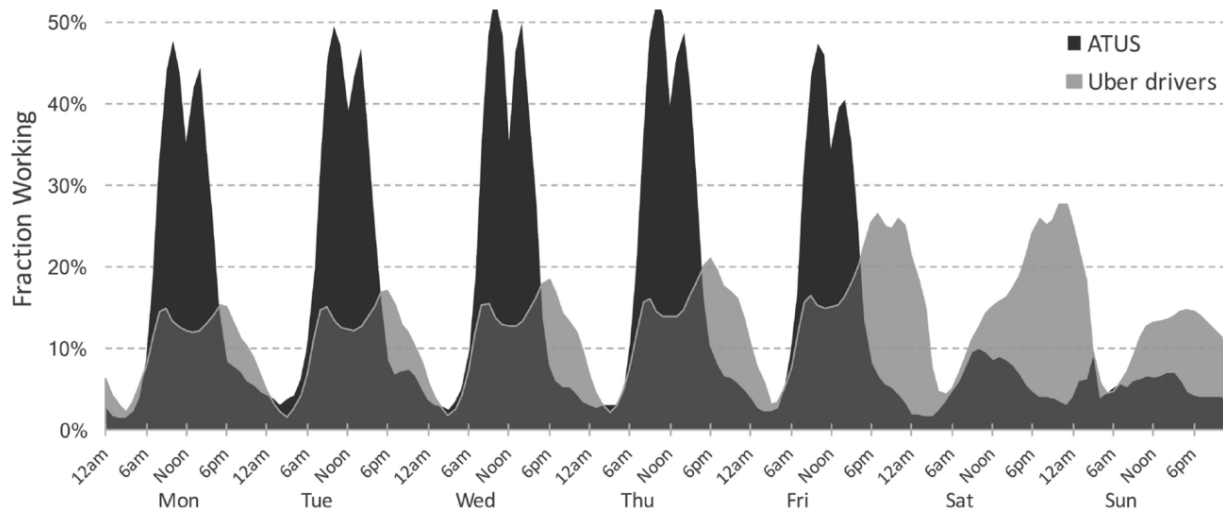
<sup>38</sup> US Bureau of Labor Statistics, American Time Use Survey, available at: <https://www.bls.gov/tus/>, accessed on March 18, 2022.

92. These trends suggest the following: (1) many of these drivers are using the Uber platform for independent work in addition to their jobs outside of platform work, and so they are engaged in ridesharing outside of regular work hours, and (2) many drivers are engaged on the Uber platform at hours when other types of work are less available.

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**EXHIBIT 32**

***More independent drivers who use the Uber platform tend to work in the evenings and weekends after regular Monday–Friday, 8am–6pm work schedules***



Source: M. Keith Chen, Judith A. Chevalier, Peter E. Rossi, and Emily Oehlsen, “The Value of Flexible Work: Evidence from Uber Drivers,” *Journal of Political Economy*, 127 (6), 2019, pp. 2735–2794.

Notes: “ATUS” is the American Time Use Survey. US Bureau of Labor Statistics, American Time Use Survey, available at: <https://www.bls.gov/tus/>.

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93. Finally, proprietary data from Uber show that independent drivers on its platform tend to work irregular hours, in the sense that very few drivers work consistent hours two weeks in a row. Exhibit 33 shows the hours worked for 100 randomly selected independent drivers over two consecutive weeks in late November and early December of 2015.

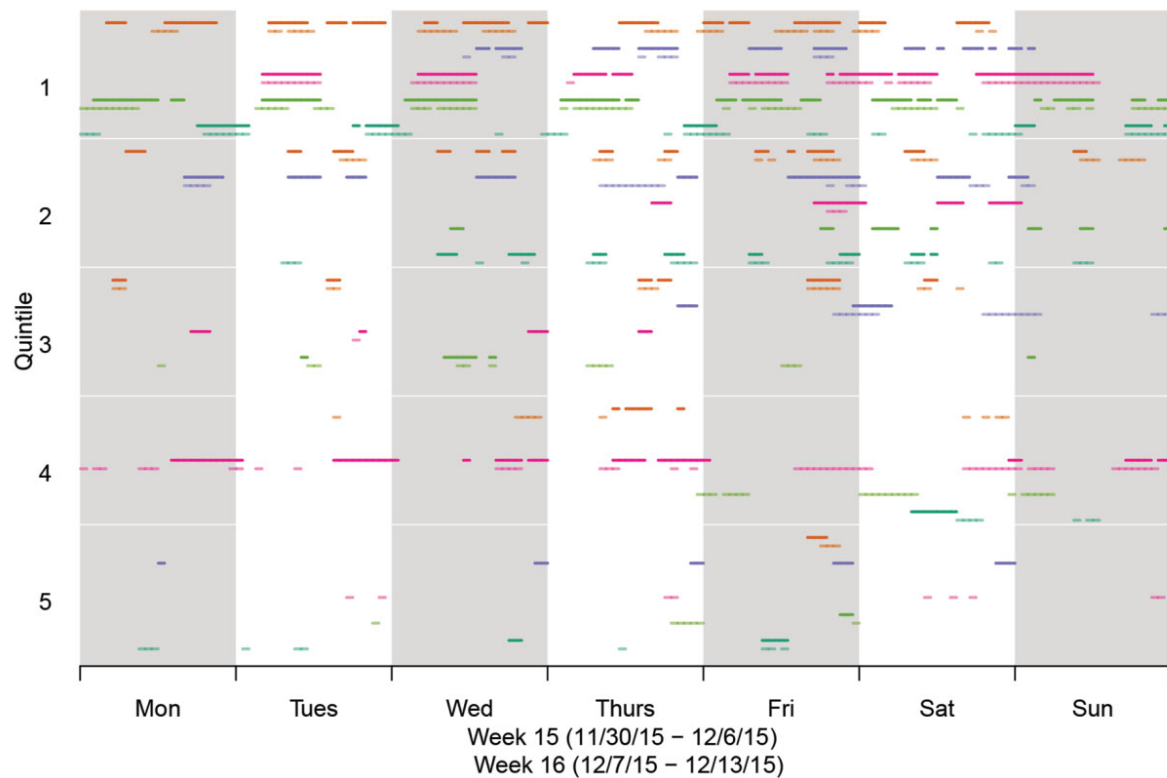
94. For each independent driver that worked during these two weeks, there are two rows of data. For example, in the first quintile by hours worked, the very top of the chart shows two orange lines, a dark orange line and a light orange line. These lines are for the hours worked in the first and second week of the sample by the same driver. We can see that this driver worked slightly different hours in the first week compared to the second week. Now in the first quintile, note the pink lines. This is another driver, who tended to work

the same schedule in both the first week and the second week. There are only a few drivers like this in the sample. Now looking at the fifth quintile by hours worked, we see that most independent drivers worked in only one of the two weeks, and they tended to work only a few hours inconsistently using the Uber platform.

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**EXHIBIT 33**

***Looking at a random sample of 100 drivers using the Uber platform over two weeks, they tend to have highly variable schedules from one week to the next***



Source: M. Keith Chen, Judith A. Chevalier, Peter E. Rossi, and Emily Oehlsen, “The Value of Flexible Work: Evidence from Uber Drivers,” *Journal of Political Economy*, 127 (6), 2019, pp. 2735–2794.

Notes: 100 drivers using the Uber platform, randomly selected, ordered by most hours (1<sup>st</sup> quintile) to least hours (5<sup>th</sup> quintile). Each driver has two lines. A dark line is for hours worked during the first week. The slightly lighter line of the same color below the dark line is for hours worked during the second week. Note that many independent drivers only work one of the two weeks, and many independent drivers in the sample do not work at all during this period.

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95. What these findings suggest is that the majority of drivers are not using the Uber platform in a way that is consistent with full-time employment, but as ad-hoc work, potentially after their regular full-time or part-time jobs, or perhaps to earn supplemental income when they otherwise would not have been working. Extrapolating this information based on Uber’s data to other platforms, we can conclude that most independent workers using rideshare

and delivery platforms would be doing so when they otherwise would not have had the opportunity to work at jobs outside of platform work.

**12. Even with conservative assumptions about how much of the earnings from rideshare and delivery platforms are incremental and about what consumers would have done if rideshare and delivery platforms were not available, the results still suggest that rideshare and delivery platforms increased Massachusetts' GDP by over 0.6 percent or \$4.2 billion in 2021**

96. There are three sensitivities we consider for the results presented above. The first has to do with the earnings of independent rideshare and delivery workers: to what extent are these earnings truly incremental, and to what extent are they just substituting from other sources of earnings. Here, we need to consider how, even if independent rideshare and delivery workers would have been engaged in some other form of work, the fact that they are choosing independent rideshare and delivery work creates vacancies elsewhere in the economy to be filled by other people. We need to consider the extent to which the earnings for independent workers in rideshare and delivery are incremental to the overall Massachusetts economy, not just to the workers themselves. Second, we need to consider the alternatives that consumers would choose if rideshare and delivery platforms were not available. Here, I conservatively assume that in place of using rideshare platforms, consumers would simply drive themselves, and in the place of using delivery platforms, consumers would pick up items themselves 70 percent of the time and cook meals for themselves rather than order from restaurants the other 30 percent of the time. I discuss each of these assumptions in more detail below.

97. First, we can consider what share of the \$625 million in additional rideshare earnings (calculated in Exhibit 7) and \$193 million in additional delivery earnings (calculated in Exhibit 10) for independent workers is truly incremental to the Massachusetts economy. Based on Exhibit 30–Exhibit 33, we know that most independent workers are engaged in platform work in addition to or as a supplement to their regular work, or they are using platforms to help smooth income during a period of unemployment. A recent survey by Pew Research Center also confirms these trends.<sup>39</sup> This would indicate that for these workers, their rideshare and delivery earnings are not

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<sup>39</sup> Pew Research Center, “The State of Gig Work in 2021,” December 8, 2021, available at: <https://www.pewresearch.org/internet/2021/12/08/the-state-of-gig-work-in-2021/>, accessed on March 20, 2022.

simply substituting for other income they would have earned if they were not engaged in platform work.

98. However, to be conservative, we can use the value from Pew Research that 68 percent of independent workers are using platforms alongside other work, which is lower than the 74 percent in Exhibit 31 who say that platforms provide a supplemental source of income. If 68 percent are doing this type of work alongside other work or for supplemental income, that means 32 percent may be using platforms as their main form of work or primary source of income. We can conservatively assume, first, that if not for these platforms, these workers would have had some other form of work, and second, that the economy is at full employment, which means no one would be pulled into employment because of an additional job vacancy created when a worker chooses independent platform work over other types of work.

99. Applying this 68 percent cut, we conservatively obtain that the incremental earnings generated because of platforms is \$425 million in rideshare and \$131 million in delivery.

100. In addition, we can add another sensitivity, which is that if rideshare platforms were not available, consumers might simply drive themselves, take another mode of transportation, or they may choose to stay home. For three markets, San Francisco, Los Angeles, and Washington, DC, we have data on mode substitution if rideshare platforms were not available.<sup>40</sup> These data suggest that between 50 and 60 percent of consumers would choose another mode of transportation that would involve use of a private vehicle. That means that only between 40 and 50 percent of the indirect effects associated with rideshare platforms presented in Exhibit 11 are truly incremental, because consumers would have purchased more inputs such as auto maintenance and gas anyway if they were not using rideshare platforms. Since the purpose of this exercise is to find a lower bound, we can conservatively assume that none of the indirect effects presented in Exhibit 11 are truly incremental and that all of the indirect effects would have occurred anyways. Thus, the only economic benefits associated with rideshare platforms are conservatively assumed to be the incremental

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<sup>40</sup> Elliot Martin, Susan Shaheen, and Adam Stocker, "Impacts of Transportation Network Companies on Vehicle Miles Traveled, Greenhouse Gas Emissions, and Travel Behavior -- Analysis from the Washington, DC, Los Angeles, and San Francisco Markets," UC Berkeley, Institute of Transportation Studies, Transportation Sustainability Research Center, November 2021, available at: <https://escholarship.org/uc/item/90b6d7r3>, accessed on March 20, 2022.



earnings for rideshare drivers when they are providing labor that would not otherwise be provided in the economy and the resulting multiplier effect from the additional consumption that these independent rideshare drivers' earnings generate.

101. We can conduct a similar sensitivity analysis for delivery. Here, we have preliminary information on the impact of online food delivery services on restaurant sales, suggesting that 30 to 50 cents of every dollar spent on online food delivery services are incremental.<sup>41</sup> Since the goal of this exercise is to identify a lower bound, we can use the value of 30 cents of every dollar as being incremental. This means that only 30 percent of the indirect effects presented in Exhibit 19 are incremental, and similarly, only 30 percent of the restaurant worker earnings associated with delivery platforms presented in Exhibit 24 are incremental.

102. We can now take all of these sensitivities and combine them to obtain a lower bound estimate for the economic impacts of rideshare and delivery platforms on the Massachusetts economy, with the following assumptions:

- We conservatively assume 68 percent of independent workers' earnings from rideshare and delivery platforms are incremental to the Massachusetts economy.
- We conservatively assume there are no indirect economic impacts from the use of rideshare platforms; if platforms were not available, consumers would simply use other transportation involving private vehicles, meaning that rideshare platforms have no indirect effect on the consumption of inputs like gas or auto maintenance.
- We conservatively assume only 30 percent of the indirect effects associated with delivery platforms are incremental.
- We conservatively assume only 30 percent of the additional restaurant worker earnings associated with delivery platforms are incremental.

103. Taking all of these conservative assumptions together, we obtain the following results for the economic impacts of rideshare and delivery

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<sup>41</sup> Jack Collison, "The Impact of Online Food Delivery Services on Restaurant Sales," Stanford University, Department of Economics, Spring 2020, available at: <https://web.stanford.edu/~leinav/teaching/Collison.pdf>, accessed on March 21, 2022.

platforms in Massachusetts and for the distribution of these impacts throughout Massachusetts, as presented in Exhibit 34 and Exhibit 35.

#### **EXHIBIT 34**

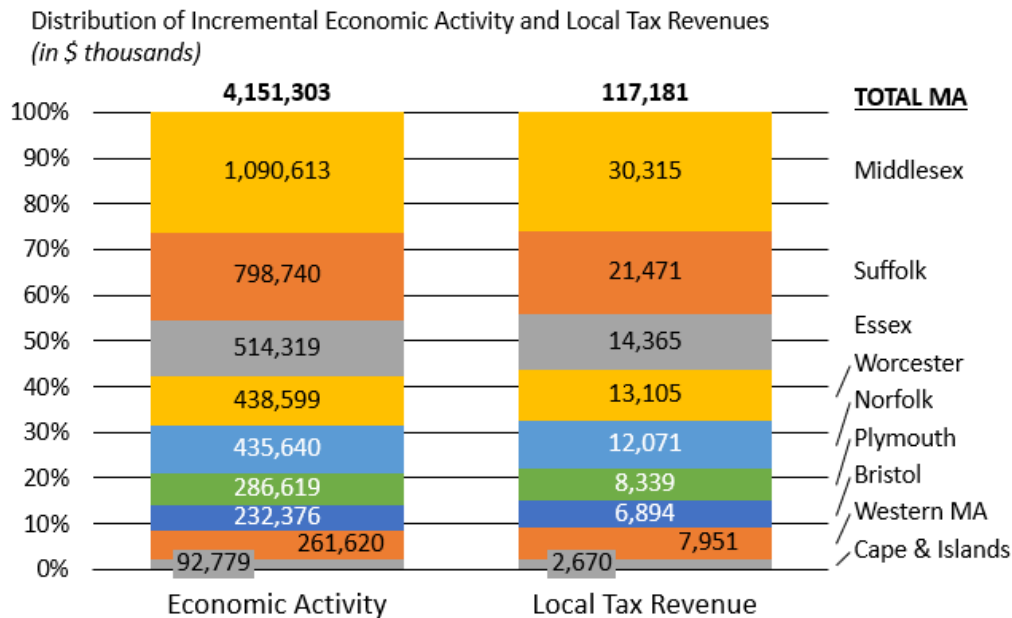
***Economic impacts associated with rideshare and delivery platforms using conservative assumptions: 28,710 additional full-time equivalent jobs in sectors outside of rideshare and delivery, \$1.7 billion in additional labor income, \$4.2 billion in additional economic output, and \$247 million in additional state and local tax revenue***

Impact	Employment	Labor Income	Output	Local Taxes	State Taxes	Total Taxes
<b>Rideshare ('18)</b>						
Direct	--	\$424,942,992	\$424,942,992	\$2,149,162	\$14,789,339	\$16,938,502
Indirect	0	\$0	\$0	\$0	\$0	\$0
Induced	1,719	\$113,263,409	\$304,081,151	\$7,418,808	\$8,766,363	\$16,185,171
<b>Total Rideshare</b>	<b>1,719</b>	<b>\$538,206,401</b>	<b>\$729,024,142</b>	<b>\$9,567,970</b>	<b>\$23,555,703</b>	<b>\$33,123,673</b>
<b>Delivery ('21 forecast)</b>						
Direct	--	\$131,143,275	\$131,143,275	\$725,030	\$4,523,353	\$5,248,383
Indirect	114	\$7,822,051	\$20,062,887	\$563,847	\$599,798	\$1,163,646
Induced	605	\$39,894,117	\$107,103,028	\$2,612,973	\$3,087,647	\$5,700,619
<b>Total Delivery</b>	<b>720</b>	<b>\$178,859,443</b>	<b>\$258,309,191</b>	<b>\$3,901,850</b>	<b>\$8,210,798</b>	<b>\$12,112,648</b>
<b>Restaurants (based on delivery '21 forecast)</b>						
Direct	18,998	\$510,417,342	\$1,711,277,277	\$75,084,210	\$61,386,119	\$136,470,329
Indirect	3,594	\$274,679,569	\$801,959,385	\$12,759,219	\$18,001,650	\$30,760,869
Induced	3,679	\$242,462,401	\$650,733,352	\$15,867,729	\$18,756,432	\$34,624,161
<b>Total Restaurants</b>	<b>26,272</b>	<b>\$1,027,559,312</b>	<b>\$3,163,970,014</b>	<b>\$103,711,158</b>	<b>\$98,144,201</b>	<b>\$201,855,359</b>
<b>TOTAL</b>	<b>28,710</b>	<b>\$1,744,625,156</b>	<b>\$4,151,303,347</b>	<b>\$117,180,978</b>	<b>\$129,910,702</b>	<b>\$247,091,680</b>

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Conservative case assumptions: (1) 68 percent of independent workers' earnings from rideshare and delivery platforms are incremental to the Massachusetts economy, (2) no indirect economic impacts for the use of rideshare platforms, (3) 30 percent of the indirect effects associated with delivery platforms are incremental, (4) 30 percent of the additional restaurant worker earnings associated with delivery platforms are incremental.

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**EXHIBIT 35*****Distribution of economic impacts by county associated with ridesharing and delivery platforms using conservative assumptions***

Source: IMPLAN Model and US Census Bureau County Business Patterns and Nonemployee Statistics; author's calculations

Notes: Conservative case assumptions: (1) 68 percent of independent workers' earnings from rideshare and delivery platforms are incremental to the Massachusetts economy, (2) no indirect economic impacts for the use of rideshare platforms, (3) 30 percent of the indirect effects associated with delivery platforms are incremental, (4) 30 percent of the additional restaurant worker earnings associated with delivery platforms are incremental. The distribution of economic activity and local tax revenue is based on how much independent rideshare and delivery workers earn and on where they live. The US Census Bureau provides this information at the county level according to these workers' tax filing data.

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104. The reality is that there is a range of likely economic outcomes associated with rideshare and delivery platforms depending on the overall macroeconomic environment in which they operate. These platforms will tend to have bigger economic multiplier effects when there are more available workers who would otherwise not be working, and similarly, they will tend to have smaller economic multiplier effects when the economy is already running at full potential.

105. In this report, I have presented both a low case and a high case of likely economic impacts associated with rideshare and delivery platforms. The low and high case suggest that rideshare and delivery platforms have increased the GDP of Massachusetts by \$4.2 billion to \$12.4 billion annually, as of 2021, which is equivalent to 0.6 percent to 1.9 percent of the economy of Massachusetts.

# APPENDIX A

## Leo Feler, Ph.D.

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### EDUCATION

Ph.D. and M.A., Economics	Brown University, Providence, RI	2005–2010
M.A., International Policy	Stanford University, Stanford, CA	2001–2002
B.A., International Relations and Economics	Stanford University, Stanford, CA	1998–2002

### PROFESSIONAL EXPERIENCE

#### ***UCLA Anderson Forecast***

*Senior Economist, July 2020–Present*

*Los Angeles, CA*

- Develop forecasts for the U.S. economy. Present forecasts at quarterly conferences. Prepare monthly forecast updates and podcasts on special topics. Engage with media on economic reporting.
- Teach courses on forecasting and emerging markets at the UCLA Anderson School of Management.

#### ***Cornerstone Research***

*Senior Economist, 2018–Present*

*Chicago, IL*

- Serve as expert witness on litigation matters.
- Develop reports on antitrust matters, with an emphasis on merger investigations, applying econometric models and computational and statistical methods to merger reviews.
- Manage and conduct economic and statistical analyses in support of expert witness testimony in commercial litigation.

#### ***Boston Consulting Group***

*Consultant, 2016–2018*

*Washington, DC*

- Led revenue growth and cost reduction initiatives for retail pharmacy client.
  - Developed and tested a consumer outreach program that reduced patient attrition, providing a projected increase in revenues of ~\$80M annually.
  - Identified improvements for patient outreach programs, targeting ~100M patients.
  - Negotiated annual savings of \$30M+ in logistics spend by optimizing route network, bundling inbound and outbound transportation volume, and procuring competitive vendor bids.
- Managed cost reduction and supply chain optimization initiatives for \$12B consumer products retailer
  - Developed cost-to-serve model providing visibility into the profitability of 50,000 products (SKUs) and negotiated with vendors to generate \$150M+ in annual savings.
  - Optimized end-to-end distribution focusing on moving product from 700 vendors through 6 distribution centers and to ~1,000 stores; annual savings of ~\$10M.

***Johns Hopkins University, SAIS***  
*Washington, DC*

*Assistant Professor of Economics, 2010–2016*

- Analyzed impact of Chinese import competition on local public finance and public good provision in the US; presented research findings at the Federal Reserve, World Bank, and top-tier universities; published research in the American Economic Journal: Economic Policy.
- Researched the ability of government-owned banks in Brazil to smooth lending during the 2008–2009 financial crisis; presented research findings at the Federal Reserve, Central Bank of Brazil, and the World Bank; published research in Journal of Monetary Economics.
- Examined the existence and persistence of Brazilian slums by collecting, assembling, and analyzing housing data; presented research at leading universities and the World Bank; published research in Journal of Urban Economics.
- Analyzed the ability of welfare transfers in Brazil to stimulate demand and reduce the depth of recessions; presented research findings at Brazil’s Ministry of Social Development and the World Bank; analysis has been cited in policy discussions and used to inform the scaling-up of transfers to ~11M poor households in Brazil.
- Taught graduate-level courses to over 800 students in Applied Econometrics, Microeconomics, and Economic Development.

***World Bank***  
*Brasilia, Brazil and Washington, DC*

*Special Assistant to the Country Director, 2003–2005*

- Contributed to the preparation of the World Bank’s Country Assistance Strategy for Brazil, determining technical assistance and lending commitments of over \$8B in 2003–2007.
- Collaborated with sector leaders and task managers to distill information and prepare regular briefings and presentations, including for meetings with the President of Brazil, state governors, and other government officials.
- Drafted over 30 op-ed pieces, on behalf of the Country Director, for publication in major Brazilian and international news outlets (Financial Times, International Herald Tribune, Washington Post, Wall Street Journal).

***Public Financial Management Group***  
*San Francisco, CA*

*Consultant, 2002–2003*

- Prepared rating agency presentations and disclosure documents for \$600M+ in bond issuances.
- Structured and priced bonds for municipal government agencies; financings included the extension of the Bay Area Rapid Transit system to the San Francisco International Airport, the remediation of land within San Francisco, and the upgrading of an electricity generation facility in Los Angeles.

**LITIGATION AND REGULATORY EXPERIENCE**

1. *Ford Motor Company*, 2021. Calculated economic impacts associated with the establishment of a proposed Ford dealership in downtown Los Angeles.
2. *Google*, 2021. Calculated alleged damages associated with advertising found to be invalid or fraudulent.
3. *Sabre/Farelogix merger*, 2020. Analyzed competitive effects on behalf of the Department of Justice.

4. *Facebook* antitrust investigation, 2020. Analyzed competitive effects of acquisitions on behalf of Facebook.
5. *T-Mobile/Sprint* merger, 2019. Analyzed competitive effects on behalf of the merging parties for Federal Communications Commission and Department of Justice investigations.
6. *21st Century Fox*, 2018. Calculated damages resulting from alleged bribery and corruption in the awarding of broadcasting rights.

## ACADEMIC PUBLICATIONS AND WORKING PAPERS

1. Trade shocks and the provision of local public goods (co-authored with Mine Senses), *American Economic Journal: Economic Policy*, 9(4), November 2017, pp. 101–43.
  - Analyzed the impact of trade-induced income shocks on the provision of local public services in the US.
  - Found that areas in the US that were more exposed to import competition from China experienced relative declines in labor demand, incomes, housing prices, and business activity.
  - Found that since local governments are disproportionately funded through property and sales taxes, declining property values and a decrease in economic activity led to less revenue, constraining the ability of local governments to provide public services.
2. Internal liquidity management and local credit provision (co-authored with Nicholas Coleman, Ricardo Correa, and Jason Goldrosen), *International Finance Discussion Papers 1204*, Board of Governors of the Federal Reserve System, May 2017.
  - Examined the effects of an external liquidity shock (the Federal Reserve’s announcement in 2013 of tapering asset purchases) on inter-branch lending across Brazilian banks.
  - Found that the reduction in external funding made banks more dependent on internal funding: banks with a higher share of deposit funding across their networks were better able to continue lending by channeling resources from high to low savings areas. Banks with a lower share of deposit funding reduced lending and lost market share.
3. Bank ownership, lending, and local economic performance during the 2008–2009 financial crisis (co-authored with Nicholas Coleman), *Journal of Monetary Economics*, 71, April 2015, pp. 50–66.
  - Examined lending in Brazil during the 2008–2009 financial crisis.
  - Found that government banks increased lending to offset declines in lending by private-sector banks and that areas with more government banks had higher employment during the crisis.
  - Found that while increased government lending mitigated an economic downturn, this lending was politically targeted, inefficiently allocated, and reduced productivity growth in the medium-term.
4. Exclusionary policies in urban development: Under-servicing migrant households in Brazilian cities (co-authored with J. Vernon Henderson), *Journal of Urban Economics*, 69(3), May 2011, pp. 253–272.
  - Examined whether poor living conditions in Brazilian slums were a result of intentional policy choices.
  - Found that Brazilian cities strategically withheld water connections to areas where low-income migrants were likely to live as a way of discouraging in-migration; withholding water connections effectively reduced population growth, particularly of low-skilled households.

- Found evidence of strategic interactions among cities within metropolitan areas: if one city provided better services to migrant households, other cities responded by withholding services, leading to segregation of migrant and non-migrant households within metropolitan areas.

## **FORECAST AND RELATED PUBLICATIONS**

1. The Economic Impact of the Pandemic is Effectively Over, and Just as the Economy Was About to Get Back to Normal, the War Between Russia and Ukraine Threatens to Increase Global Inflation and Slow Down Economic Growth, UCLA Anderson Forecast, March 2022
2. With the Omicron Variant, an Uncertain Recovery and the Potential for Slower Growth and Higher Inflation, UCLA Anderson Forecast, December 2021, pp. 13–40
3. From Sizzling to Ho-hum: A Slower Economic Rebound as Consumers Adjust to a Continuing Pandemic, UCLA Anderson Forecast, September 2021, pp. 13–48.
4. A Robust but Bumpy Recovery as the Economy Transitions from the Pandemic, UCLA Anderson Forecast, June 2021, pp. 13–52.
5. Robust Economic Growth and Recovery After a Dreadful Year, UCLA Anderson Forecast, March 2021, pp. 13–50.
6. A Gloomy COVID Winter and an Exuberant Vaccine Spring, UCLA Anderson Forecast, December 2020, pp. 13–22, 43–62.
7. The Recovery is Losing Momentum (co-authored with Jerry Nickelsburg), UCLA Anderson Forecast, September 2020, pp. 13–22, 47–67.
8. Proposition 22 and the Reclassification of Uber and Lyft Drivers as Employees versus Independent Contractors, UCLA Anderson Forecast Direct, September 2020
9. Recovery and the Risk of Inflation in the Post-COVID-19 Economy (co-authored with Jerry Nickelsburg), Wealth Management: Trusts & Estates, August 21, 2020, available at: <https://www.wealthmanagement.com/estate-planning/recovery-and-risk-inflation-post-covid-19-economy>.