BEA Working Paper Series, WP2020-14

Consumer Prices During a Stay-In-Place Policy: Theoretical Inflation for Unavailable Products

Author Rachel Soloveichik, Research Economist

Contact Rachel.Soloveichik@bea.gov

Date December 2020

Abstract Major product categories like in-person restaurant meals, live entertainment, and non-essential personal services are unavailable during a stay-in-place policy. As a result, their inflation rates cannot be measured directly. This paper uses previous research on the value of tourist amenities (Florida 2018a) and a newly developed model of tourist behavior to calculate a theoretical price for unavailable products. In this paper, the word "theoretical" designates an imputed price which is consistent with price measurement theory (Diewert and Fox 2020) (Diewert et al. 2019) (Diewert 2003). It does not imply any data problems or computational mistakes with either the consumer price index (CPI) published by the Bureau of Labor Statistics (BLS 2018) or with any other cost-of-living indexes.

This analysis estimates monthly product unavailability in every region of the United States. Based on those regional data estimates, the paper calculates that the average U.S. consumer experienced theoretical inflation at least 1.4 percentage points higher than the published CPI in the first quarter of 2020, at least 6.0 percentage points higher than the published CPI in the second quarter, and at least 2.8 percentage points lower than the published CPI in the third quarter. The faster inflation rates in the first two quarters of 2020 reinforces the measured declines in real consumption during those quarters and the slower inflation rate in the third quarter of 2020 reinforces the measured recovery in real consumption during the third quarter. In other words, at least one third of the theoretical decline and recovery in real consumption is not reflected in published economic statistics.

Keywords Inflation, COVID-19, Coronavirus, Stay-In-Place, Mobility, Weather, Regional

JEL Code E31, I18, K32

Bureau of Economic Analysis
U.S. DEPARTMENT OF COMMERCE

Introduction

In the short term, the COVID-19 pandemic reduced the consumer price index (CPI) statistics published by the Bureau of Labor Statistics (BLS). To begin, large price decreases during the COVID-19 pandemic are both common and well reported. For example, transportation services prices fell quickly in Spring 2020 (BLS 2020a). On the other hand, large price increases during emergencies are discouraged by both local laws and social norms (Tarrant 2015). In aggregate, the published CPI showed a modest decrease early in the pandemic (BLS 2020a). However, this paper argues that theoretical cost-of-living actually increased by more than 7 percentage points over the same time period. In this paper, the word “theoretical” designates a cost-of-living index which is consistent with theory on product unavailability. It does not imply any data problems or computational mistakes in other cost-of-living indexes.

This paper is divided into six sections. Section 1 briefly reviews the previous price measurement literature. Section 2 creates and solves a mathematical model to calculate theoretical prices when broad categories of products are unavailable. Section 3 gives summary statistics on unavailability during a stay-in-place policy. Section 4 then describes how time usage data from Google’s COVID-19 Community Mobility Reports can be combined with data from the American Time Use Survey to calculate the absolute amount of time spent at retail and recreational locations. Section 4 then goes on to use this absolute amount of time as a proxy for product unavailability and theoretical inflation by region. Appendix A shows detailed data on unavailability for individual commodities. Finally, Appendix B shows detailed monthly data on actual time usage for each metropolitan statistical area and nonmetropolitan area tracked by the Bureau of Economic Analysis (BEA) in its regional accounts.

1. Brief Review of Price Measurement Literature

For simplicity, this paper focuses on calculating a Laspeyres price index for a basket of n products. Product prices in the base period (t=0) are designated as (p_{10}, ..., p_{n0}), spending weights for products in the base period are designated as (w_{10}, ...,w_{n0}), and product prices in the period *t* are designated (p_{1t}, ..., p_{nt}). If all those vectors are known, then the Laspeyres formula is simple:

(1) $$\text{Laspeyres Index}_t = w_{10}(p_{1t}/p_{10}) + w_{20}(p_{2t}/p_{20}) + \ldots + w_{n0}(p_{nt}/p_{n0})$$

Unfortunately, the Laspeyres formula above cannot be calculated when prices in time *t* are not observable, but analysts can salvage the situation by imputing the missing prices. This paper studies a scenario in which all products are available at the base period, but only 1 to j are available in time *t*. The paper designates the observable prices for available products as (p_{1t}, ..., p_{jt}) and the imputed prices for unavailable products as (ip_{j+1T}, ..., ip_{nt}). The Laspeyres formula is now:

(2) $$\begin{gathered}\text{Theoretical Laspeyres Index}_t = w_{10}(p_{1t}/p_{10}) + w_{20}(p_{2t}/p_{20}) + \ldots\ w_{j0}(p_{jt}/p_{j0}) \\ + w_{j+10}(ip_{j+1t}/p_{j+10}) + \ldots + w_{n0}(ip_{nt}/p_{n0})\end{gathered}$$

BLS makes a standard assumption in order to impute unobservable prices when calculating the published CPI—it assumes that unobservable prices track observable prices for similar products (Gomes 2018). In normal economic times, the standard assumption appears to be quite accurate, and therefore the published CPI tracks closely with a cost-of-living index that is consistent with price measurement theory (Bradley 2003). However, this paper argues that the standard assumption does not hold during unusual circumstances, like a stay-in-place policy that makes broad categories of goods and services completely unavailable. As a result, price measurement theory is needed to measure inflation rates.

1.1 Previous Research on Imputing Prices for Unavailable Products

There are few pre-pandemic papers studying the problem of imputing prices for suddenly unavailable products. The reason for that gap is simple: past public health interventions were generally restricted to high risk groups, like travelers or individuals with known symptoms (Tognotti 2013). Because public health authorities rarely—if ever—tried complete lockdowns of entire regions before the COVID-19 pandemic, there is neither previous epidemiological research estimating its impact on disease transmission (Stone 2020) nor previous economic research estimating its impact on either consumer welfare or cost-of-living indexes. Similarly, it was very rare for popular product categories to be suddenly unavailable for nonhealth reasons. However, there are three price measurement bodies of literature that are theoretically related to the problem of imputing prices for suddenly unavailable products. This section describes each body of literature briefly.

The **new goods literature** studies the theoretical price impact of introducing entirely new product categories to the market basket. That literature typically uses economic theory and empirical data to create demand models. The literature then goes on to solve the created demand models to estimate theoretical inflation for newly available products (Hausman 1999), (Hausman 1997), (Petrin 2002), (Goolsbee and Petrin 2004), (Berndt et al. 1996), (Nordhaus 1996), (Diewert and Feenstra 2019), and (Diewert et al. 2019). By construction, the Laspeyres price increase associated with a newly unavailable product is the exact converse of the Paasche price decrease associated with a newly available product. Hence, the theoretical background developed in these papers may shed light on the general problem of unavailable products. However, the demand models used in those papers are difficult to create or solve when many broad product categories are suddenly unavailable.

The **outlet substitution bias literature** studies the theoretical price impact of introducing new retail channels. Conceptually, this literature is very close to the new goods literature because both entirely new products and existing products sold at new retail channels have no price history for BLS to link (BLS 2018). However, the outlet substitution bias literature typically makes the simplifying assumption that a particular good is identical regardless of which outlet it is sold (Reinsdorf 1993), (Hausman and Liebtag 2009), and (Greenlees and McClelland 2008). If that same simplifying assumption was applied during the COVID-19 pandemic, then online prices could be used as proxy prices for goods which are unavailable in-person. However, that simplifying assumption cannot be applied to unavailable services, which account for three times as much consumer spending as unavailable goods.

The **variety bias literature** studies the theoretical price impact of introducing new varieties of the same product category. The question in that literature is how to aggregate prices for individual varieties to calculate a broad category cost-of-living index (Feenstra 1994) (Broda and Weinstein 2010) (Handbury and Weinstein 2014). The variety bias literature typically makes the simplifying assumption that consumers have very specific and easy to solve utility functions. These solvable utility functions are well calibrated to study the problem of consumer choice for individual varieties within narrow product categories like soft drinks. However, it is not clear if those same solvable utility functions apply when broad product categories are unavailable during a stay-in-place policy.

1.2 Price Measurement Questions Not Studied in this Paper

Readers should note that this paper does not study other price measurement topics. There is long-standing theoretical literature discussing questions like which products should be included in the market basket, how to measure prices for each product, what weight each product should be assigned, and which formulas should be used to aggregate price changes for individual products (Diewert 2003), (Diewert 2001), (Passero, Garner, and McCully 2015), and (Barret, Levell, and Milligan 2015). More recently, researchers have studied the practical problems of constructing a market basket during the COVID-19 pandemic (Cavallo 2020) (Diewert and Fox 2020) and measuring prices when in-person data collection is not possible (BLS 2020b). Neither of these bodies of literature are directly related to the theoretical problem of pricing unavailable products, so they will not be studied further in this paper.

This paper does not study quality changes. Some economists have suggested viewing product unavailability through the lens of quality change (Cowen 2020), and previous researchers have explored treating temporarily unavailable items in grocery stores as a reduction in retail service quality (Matsa 2011). Similarly, the disappearance of live sporting events could be viewed as a dramatic quality reduction in cable sports packages (Sherman 2020). However, measuring quality changes consistently for all goods and services impacted by the COVID-19 pandemic would be a difficult empirical project. Furthermore, a portion of service model changes may be captured in the quality adjustments that are already part of the published CPI (BLS 2019). This paper will not study quality adjustment further.

Finally, this paper does not study consumer utility. Consumer utility depends jointly on current market purchases, household inventories of previously purchased goods, and home production (Becker 1965). In many cases, household inventories of previously purchased goods and home production can partially substitute for products that are currently unavailable in the market sector. Researchers who are focused on the dynamic problem of measuring consumer utility throughout the COVID-19 pandemic may need to model both household inventories and home production carefully. However, this paper focuses on the static problem of purchasing a constant market basket over time. This static cost-of-living is the concept tracked in most price measurement research, so the cost-of-living index presented in this paper should be comparable to other cost-of-living indexes.

2. Mathematical Model for Calculating Cost-of-Living

This paper uses a novel approach to calculate prices for unavailable products: it compares regional cost-of-living indexes to calculate a theoretical price for products available in one region but not another. There is rich economic literature showing that dense urban regions have higher prices than rural regions for seemingly similar housing units (Aten and D'Souza 2008) (Gyourko, Mayer, and Sinai 2013) (Glaeser and Gyourko 2018), physically identical goods (Stroebel and Vavra 2019), and physically identical non-housing services (Paredes and Loveridge 2014). There is also rich literature showing that dense urban regions offer a wide variety of nonessential products like restaurants, live entertainment, fashionable clothing, and other desirable amenities (Glaeser, Kolko, and Saiz 2001) (Florida 2018b) (Couture et al. 2020). This paper combines these two bodies of literature with a model of tourist behavior to calculate the theoretical prices for unavailable products.

The paper's model assumes that rational tourists choose a destination which maximizes utility for a given vacation budget. Tourists are generally not affected by nonprice regional factors like jobs, schools, or income taxes. Furthermore, nearby urban and rural regions typically have similar weather and similar travel costs. As a result, the presence of tourists in the urban region strongly suggests that tourists derive sufficient utility from urban amenities to outweigh the higher urban prices (Florida 2018a) (Carlino and Saiz 2019).

2.1 General Model Setup

This paper begins by setting up a general model of regional price differences in an economy with six products: one housing product (h), two broadly available goods (g1 and g2), two broadly available services (s1 and s2), and one amenity (a). Next, the model assumes that there are two regions, one rural (R) and one urban (U), which each have their own prices. In order to reduce the number of coefficients, normal urban prices for each of the six products is set at 1. The prices in region R are designated (p_{hR}, p_{g1R}, p_{g2R}, p_{s1R}, p_{s2R}, and p_a). Finally, the paper assumes that there are two types of consumers in the economy, tourists (T) and locals (L). Tourists and locals pay the same price for a particular product in a particular region[1] but they allocate their budgets differently. The spending share for tourists is designated as (w_{hT}, w_{g1T}, w_{g2T}, w_{s1T}, w_{s2T}, and w_{aT}) and the spending share for locals is designated as (w_{hL}, w_{g1L}, w_{g2L}, w_{s1L}, w_{s2L}, and w_{aL}). By construction, the six spending shares for tourists sum to w_T and the six spending shares for locals w_L, with $w_T + w_L = 1$.

1. In practice, tourists and locals buy slightly different products in each category, so prices need not match perfectly. But the two markets use similar inputs and have very similar average prices. For example, the federal government's regional hotel *per diems* track closely with regional housing prices.

2.2 Formulas to Calculate Regional Price Differences

If all products are available in both regions and prices are observable, then it is straightforward to calculate average rural prices for each group:

(3) $$\text{Tourist Prices} = [w_{hT}*p_{hR} + (w_{g1T}*p_{g1R} + w_{g2T}*p_{g2R}) + (w_{s1T}*p_{s1R} + w_{s2T}*p_{s2R}) + w_{aT}*p_{aR}]/w_T$$

(4) $$\text{Local Prices} = [w_{hL}*p_{hR} + (w_{g1L}*p_{g1R} + w_{g2L}*p_{g2R}) + (w_{s1L}*p_{s1R} + w_{s2L}*p_{s2R}) + w_{aL}*p_{aR}]/w_L$$

(5) $$\begin{gathered}\text{Combined Prices} =(w_{hT} + w_{hL})*p_{hR} + (w_{g1T} + w_{g1L})*p_{g1R} + (w_{g2T} + w_{g2L})*p_{g2R} \\ + (w_{s1T} + w_{s1L})*p_{s1R} + (w_{s2T} + w_{s2L})*p_{s2R} + (w_{aT} + w_{aL})*p_{aR}\end{gathered}$$

However, the price calculations are more complicated when the rural region does not offer the amenity product. As mentioned earlier, the formula for calculating price levels requires a price for every product in the market basket—so the analyst must impute rural prices for amenity products. This imputed price is designated ipaR. Average rural prices for each group are:

(6) $$\text{Tourist Prices} = [w_{hT}*p_{hR} + (w_{g1T}*p_{g1R} + w_{g2T}*p_{g2R}) + (w_{s1T}*p_{s1R} + w_{s2T}*p_{s2R}) + w_{aT}*ip_{aR}]/w_T$$

(7) $$\text{Local Prices} = [w_{hL}*p_{hR} + (w_{g1L}*p_{g1R} + w_{g2L}*p_{g2R}) + (w_{s1L}*p_{s1R} + w_{s2L}*p_{s2R}) + w_{aL}*ip_{aR}]/w_L$$

(8) $$\begin{gathered}\text{Combined Prices} = (w_{hT} + w_{hL})*p_{hR} + (w_{g1T} + w_{g1L})*p_{g1R} + (w_{g2T} + w_{g2L})*p_{g2R} \\ + (w_{s1T} + w_{s1L})*p_{s1R} + (w_{s2T} + w_{s2L})*p_{s2R} + (w_{aT} + w_{aL})*ip_{aR}\end{gathered}$$

BLS's general methodology uses prices for similar products as a proxy for the unavailable products. In this simplified model, available rural services are assumed to be a proxy for the unavailable rural amenity. Given that assumption, the average rural prices for each group are:

(9) $$\begin{gathered}\text{Quasi-BLS Tourist Price} = [w_{hT}*p_{hR} + (w_{g1T}*p_{g1R} + w_{g2T}*p_{g2R}) \\ + (w_{s1T}*p_{s1R} + w_{s2T}*p_{s2R})*\{1+w_{aT}/(w_{s1T} + w_{s2T})\}]/w_T\end{gathered}$$

(10) $$\begin{gathered}\text{Quasi-BLS Local Price} = [w_{hL}*p_{hR} + (w_{g1L}*p_{g1L} + w_{g2L}*p_{g2L}) \\ + (w_{s1L}*p_{s1L} + w_{s2L}*p_{s2L})*\{1+w_{aL}/(w_{s1L}+w_{s2L})\}]/w_L\end{gathered}$$

(11) $$\begin{gathered}\text{Quasi-BLS Combined Prices} = (w_{hT} + w_{hL})*p_{hR} + (w_{g1T} + w_{g1L})*p_{g1R} + (w_{g2T} + w_{g2L})*p_{g2R} \\ + [(w_{s1T} + w_{s1L})*p_{s1R} + (w_{s2T} + w_{s2L})*p_{s2R}]*[1 + (w_{aT} + w_{aL})/(w_{s1T} + w_{s2T} + w_{s1L} + w_{s2L})]\end{gathered}$$

2.3 Calculating Theoretical Prices for Unavailable Products

This paper uses an alternative methodology to calculate prices for the unavailable amenity. The alternative requires two additional assumptions: 1) tourists regularly visit both the rural and urban regions and 2) the rural region and the urban region have similar nonprice attributes for tourists (for example, weather and travel distance). If those two assumptions hold, then the tourist basket that can be purchased for a fixed vacation budget must be identical in both regions:

(12) $1 = \text{Theoretical Tourist Prices} = w_{hT}*p_{hR} + (w_{g1T}*p_{g1R} + w_{g2T}*p_{g2R}) + (w_{s1T}*p_{s1R} + w_{s2T}*p_{s2R}) + w_{aT}*ip_{aR}$

(13) So that $ip_{aR} = (1/w_{aT}) - [w_{hT}*p_{hR} + (w_{g1T}*p_{g1R} + w_{g2T}*p_{g2R}) + (w_{s1T}*p_{s1R} + w_{s2T}*p_{s2R})]/w_{aT}$

For illustrative purposes, consider the case of a tourist who is deciding whether to visit an urban or rural region in Louisiana. BEA's published regional price parities for 2018 show consistently higher prices in the New Orleans metropolitan area compared to nonmetropolitan regions of Louisiana (91.2 vs. 52.1 for housing, 97.2 vs. 92.8 for goods and 92.6 vs. 92.5 for services). Yet New Orleans earned more than ten times as much tourism revenue as nonmetropolitan regions of Louisiana (Charters 2019). Clearly, tourists must derive enough value from New Orleans amenities like Mardi Gra parades to offset its higher hotel prices. Based on BEA's published travel and tourism accounts (Franks and Osbourne 2019), this paper calculates the following product weights: $w_{hT} = 0.28$, $(w_{g1T} + w_{g2T}) = 0.26$, $(w_{s1T} + w_{s2T}) = 0.21$, and $w_{aT} = 0.25$.[2] Given those weights and Louisiana prices, equation (10) above can be solved:

(14) $ip_{aR} = (1/0.25) - [0.28*(52.1/91.2) + 0.26*(92.8/97.2) + 0.21*(92.5/92.6)/0.33 = 1.53$

In other words, tourists to Louisiana value the specialized urban amenities provided by New Orleans so much that they would pay 53 percent above their current market price to keep them available. This sizable premium is sufficient to raise the average cost-of-living for tourists to non-metropolitan Louisiana by 13 percent.

In practice, the calculation above depends on the exact regions chosen for comparison. This paper uses an ordinary least squares (OLS) regression to estimate what prices would be in each region if that region had no amenities.[3] By design, this OLS regression holds weather, jobs, and other non-price factors constant. This analysis then imputes region-specific amenity prices using the formula solved above for Louisiana. Across all regions, the average price premium for unavailable amenities is 1.59. This average price premium is used for calculations in sections 3 and 4.

---

2. Consistent with assumption 2, costs related to long distance travel are excluded from the vacation budget. Next, travel accommodations are allocated to housing, shopping is allocated to goods, intracity travel and restaurant spending are allocated to services, and finally, recreation is allocated to amenities. Readers should note that this allocation between product categories may not match the allocation used by BEA to calculate regional price parities.

3. This coefficient is estimated using a weighted OLS regression of log prices on the share of employees working in North American Industry Classification System category 71 (The worker share data is taken from the Quarterly Census of Employment and Wages and top coded at 3 percent in order to reduce the influence of outliers). The regression is run separately for goods, housing, and services. Previous drafts of this paper used the cheapest region of the country (Beckley, WV) as a comparison.

3. Which Products Are Unavailable During a Full Stay-in-Place Policy?

This paper studies the full impact of stay-in-place policies on nonessential products. A portion of the unavailable products studied in this paper can be explained by explicit stay-in-place orders issued by city or state governments (Dave et al. 2020 and Allcott et al. 2020). However, many businesses closed voluntarily (Takashi 2020) and many consumers stopped visiting open businesses before government stay-in-place orders were implemented (Molla 2020). Conversely, some businesses started reopening before government stay-in-place orders were lifted (Lee 2020). This paper does not attempt to separately estimate the contribution of government orders, business decisions, and consumer decisions; rather, it studies how all three factors combine to make some nonessential products unavailable.

This paper does not study the impact of COVID-19 on either essential products or online products. It may be true that shortages of important items, like toilet paper, were common early in the COVID-19 pandemic and scattered shortages have continued for months (Gasparo and Stamm 2020) (Cavallo and Kryvtsov 2020). However, it is common for individual goods to be out of stock and shoppers can generally compensate for partial product unavailability by selecting a close substitute or visiting another store (Andersen 1996). As a result, a slight decrease in the variety of products available for purchase in one particular retailer is likely to cause much less welfare loss than complete unavailability of a broad product category. Furthermore, calculations based on Appendixes A and B find that tracking in-store shortages of essential goods and online shortages of nonessential goods only raises aggregate product unavailability in April by 10 percent (from $1.8 trillion to $2.0 trillion of potential annualized consumer spending).[4] For simplicity, this paper will not include product shortages in the theoretical inflation numbers calculated or in the discussion.

3.1 Which Goods and Services are Unavailable?

Appendix A uses the author's best judgment to classify each of the 222 consumer commodities tracked by BEA in its published table "Personal Consumption Expenditures by Type of Product" (2.4.5U) between the four product groups studied (goods, services, housing, and amenities). In total, Appendix A calculates that goods account for $4.2 trillion of consumer spending, services account for $6.3 trillion of consumer spending, housing accounts for $2.6 trillion, and amenities account for $0.3 trillion. These spending numbers include medical care paid for by employer sponsored health insurance, gambling services, and other spending categories that the BLS treats as out-of-scope for the consumer market basket (BLS 2018).

---

4. Appendix A shows that $3.5 trillion of products would be unavailable under a full stay-in-place policy. But the time usage numbers in Appendix B suggest that the average stay-in-place policy implemented in April was only half as restrictive as a full stay-in-place policy. After April, product shortages decreased together with reopening.

Next, Appendix A uses the 2017 Economic Census and the author's best judgment to measure unavailability for each commodity. For most goods, the unavailability share can be estimated precisely using the detailed product line data by kind of business provided in the 2017 Census of Retail.[5] For example, 71 percent of women's clothing was sold at specialty clothing retailers and other nonessential in-person stores—so the paper assumes that women's clothing is 71 percent unavailable during a full stay-in-place policy. For some services, the unavailability share can also be estimated precisely using detailed product line data. For example, limited service eating places prepared 46 percent of their meals for consumption on-premises—so the paper assumes that 46 percent of their output is unavailable during a full stay-in-place policy. Unfortunately, the 2017 Economic Census does not always provide the product line details necessary to distinguish between available and unavailable services. For example, medical services are split between disease category, but not between emergency care (which is available during a stay-in-place policy) and elective care (which is not available during a stay-in-place policy). For those commodities, the paper uses the author's best judgement to estimate unavailability. This paper focuses on the mean level of unavailability shown in Appendix A rather than the distribution of unavailability across either narrow commodity lines or broader commodity groups.

The most important result from Appendix A is that unavailability is common. Under a full nationwide stay-in-place policy, approximately 6 percent of housing, 29 percent of goods, 51 percent of services, and 99 percent of amenities are not available.[6] Section 2 used regional price differences to calculate a price premium of at least 59 percent for unavailable products. Hence a full nationwide stay-in-place policy would raise theoretical category price indexes by at least 4 percent for housing, 17 percent for goods, 31 percent for services, and 59 percent for amenities. These estimated category inflation rates are much larger than the average category inflation rates reported by BLS in their published data.

This paper focuses on consumer cost-of-living and does not study the impact of product unavailability on business costs for either investment goods or intermediate inputs. It also does not study the impact of stay-in-place policies on government output tracked by BEA in Table 3.16 "Government Current Expenditures by Function," household output tracked by BEA in satellite accounts (Bridgman et al. 2012), or leisure activity not tracked by BEA.

5. The point estimates reported in this paper are based on 2017 data. Adjusting for economic changes between 2017 and 2020 might slightly change the point estimates but would not change the qualitative results.

6. These unavailability shares are weighted by personal consumption expenditures for each commodity line. Readers should note that the unavailability shares shown in Appendix A do not necessarily predict sales changes.

3.2 Calculating Aggregate Cost-of-Living Increases When Products Are Unavailable

This section of the paper focuses on calculating theoretical prices during a stay-in-place policy. Observable prices for available products are designated (p_{hSIP}, p_{g1SIP}, and p_{s1SIP}) and imputed prices for the unavailable products are designated (ip_{g2SIP}, p_{s2SIP}, and ip_{aSIP}). Unlike tourists, locals cannot easily move from one region to another and they are heavily impacted by nonprice regional attributes like jobs, public schools, or income taxes. As a result, local urban prices need not equal local rural prices either during the COVID-19 pandemic or in normal times.[7] Nevertheless, tourist behavior can still provide valuable guidance on theoretical prices for unavailable products during a stay-in-place policy.

This paper makes a key assumption in order to calculate the price impact of unavailable products—it assumes that locals value unavailable products at least as highly as tourists value unavailable amenities. This assumption can be justified with two related arguments. First, many of the goods and services unavailable during a stay-in-place policy are less discretionary than tourist amenities. For example, nonemergency medical care is generally seen as more important than a Mardi Gras parade, and its unavailability probably creates a larger welfare loss. Second, both tourists and locals have heterogenous preferences and almost certainly choose their location partially based on those preferences. For example, an individual who likes nature might choose nonmetropolitan Louisiana and an individual who likes parades might choose New Orleans. The price premium for unavailable amenities in normal times is calculated based on the marginal tourist who is almost indifferent between the two regions. But the price premium for unavailable products during a stay-in-place policy is calculated for the average local, who may have very strong preferences for the goods and services normally available in their current region. Given that key assumption, and the earlier calculation that imputed price for unavailable tourist amenities is at least 1.59, the formula to calculate combined prices for tourists and locals is:

$$\begin{aligned}\text{Theoretical Prices} \geq\ & (w_{hT} + w_{hL})*p_{hSIP} + (w_{g1T} + w_{g1L})*p_{g1SIP} \\ & + (w_{s1T} + w_{s1L})*p_{s1R} + (w_{g2T} + w_{g2L} + w_{s2T} + w_{s2L} + w_{aT} + w_{aL})*1.59\end{aligned} \tag{15}$$

This paper is focused on comparing the theoretical cost-of-living with the CPI. As mentioned earlier, BLS's general methodology uses prices for similar products as a proxy for the unavailable products. In this simplified model, good 1 is used as a proxy for good 2 and service 1 is used as a proxy for service 2 and amenities. Using that methodology, aggregate prices during a stay-in-place policy are estimated as:

7. Empirical measurement of prices for locals is also harder because locals often sign long-term contracts for services. These long-term contracts create apparent price stickiness, even if prices are flexible.

$$\text{(16)} \quad \text{Quasi-BLS Prices} = (w_{hT} + w_{hL})^{*}p_{hSIP} + (w_{g1T} + w_{g1L} + w_{g2T} + w_{g2L})^{*}p_{g1SIP} + (w_{s1T} + w_{s1L} + w_{s2T} + w_{s2L})^{*}p_{s1SIP}{}^{*}[1 + (w_{aT} + w_{aL})/(w_{s1T} + w_{s2T} + w_{s1L} + w_{s2L})]$$

The two equations for theoretical prices and quasi-BLS prices look complex—but all the terms are readily calculable using unavailability shares in Appendix A and BLS's published category indexes:

Table 1: Known Spending Shares and Calculated Inflation Rates

Product studied	Spending shares	Relative price levels (February 2020 base)						
		March	April	May	June	July	August	September
Housing	18%	100.0	100.0	100.1	100.3	100.5	100.8	100.9
Good 1	24%	98.9	96.8	96.7	98.0	98.8	99.4	99.6
Good 2	7%	–	–	–	–	–	–	–
Service 1	31%	99.8	99.2	98.9	99.2	100.1	100.3	100.4
Service 2	16%	–	–	–	–	–	–	–
Amenities	2%	–	–	–	–	–	–	–
Combined cost-of-living index								
Theoretical		115.2	114.6	114.4	114.9	115.4	115.7	115.7
Quasi-BLS		99.6	98.6	98.4	99.0	99.8	100.1	100.2
Actual CPI		99.6	98.8	98.7	99.3	99.9	100.2	100.4

Table 1 shows that the quasi-BLS cost-of-living index matches well with the actual CPI, suggesting that the simplifying assumptions used in this paper to calculate combined prices do not distort measured inflation. However, both the quasi-BLS cost-of-living index and the actual CPI are about 15 percentage points lower than the theoretical cost-of-living index calculated using this paper's model. This calculated 15 percentage point difference is consistent with survey data. One recent study asked Swedish respondents to report the monetary compensation that they would be willing to accept in return for following hypothetical restrictions on their nonwork time. That paper found that the average Swedish household required monetary compensation equal to 20 percent of personal consumption expenditures in order to accept hypothetical restrictions similar to the stay-in-place policies implemented in the most restrictive regions of the United States (Andersson et al. 2020).[8] This number is reasonably close to the 15 percent theoretical inflation rate calculated above.

8. For consistency, this paper converts the GDP share in that paper to a fraction of consumer spending. To be clear, the Swedish survey questions do not correspond precisely to stay-in-place policies implemented in the United States.

4. Tracking Actual Product Unavailability for Each Region

It is difficult to measure product availability directly, so this analysis relies on time usage data instead. In particular, time spent at retail and recreational locations is assumed to be a proxy for product availability. Two primary datasets provide data on time use in each region of the United States. First, the paper uses the Google's published COVID-19 Community Mobility Reports to measure daily time use *relative* to median time use during the base period of January 3, 2020 through February 6, 2020.[9] Next, the paper uses data from the American Time Use Survey (ATUS) to measure the normal amount of time spent at retail and recreational locations[10] in each region. Many important services and amenities are shared by nearby neighborhoods or counties, so this analysis aggregates county level time usage data into regions that comprise either a metropolitan statistical area or a non-metropolitan area of a state.

Figure 1 shows the average regional time usage for the period 2003 to 2018.[11] In normal times, Americans spend about 75 minutes per day at retail and recreational locations. The most important result in Figure 1 is that retail and recreational time is relatively uniform. The region with the least time spent at retail and recreational locations (nonmetropolitan Mississippi) has only 18 percent less time in those locations than the mean, and the region with the most time spent at retail and recreational locations (San Jose, California) has only 23 percent more time in those locations than the mean. Similarly, the ATUS also reports that average retail and recreational time hovered within 15 percent of its median quarterly value for the entire time period of 2003 to 2018. Hence, most products are likely available in most regions from 2003 to 2018.

Figures 2 through 4 show time use for March 2020 and the second and third quarters. These figures are calculated by combining the normal time use data shown in Figure 1 with the relative changes in time use reported in the COVID-19 Community Mobility Reports to get the *absolute change* in time use in every region tracked by BEA. The most important result in those figures is that retail and recreational time decreased almost everywhere. The average decrease in the second quarter was 29 percent, larger than any previous variation seen across regions or over time. The second most important result is that retail and recreational time fell by more in wealthy urban

9. Google does not report full time usage data for every county. Missing counties are interpolated.

10. The variable coded "where" gives a broad location description. Places with "where" codes 104, 107, 111, 112, and 114 are assumed to match Google's "retail and recreation" locations. These retail locations include some essential businesses, but grocery stores and pharmacies are tracked separately.

11. Many regions are not identified separately in the ATUS and other regions have very few respondents. In order to reduce volatility, the paper uses regional housing prices, service prices, and metropolitan status to predict retail and recreational time for each region and day type. Those time usage predictions are then averaged with actual ATUS data to get calculated regional time usage. The ATUS population is not a perfect match for Google's sample because it includes individuals without smartphones but excludes children under 15.

regions. Figure 1 shows that retail and recreational time is normally highest in regions with high housing prices—but that relationship disappeared in March 2020 and then reversed sign in the second and third quarters. This larger change in time usage is consistent with previous research (Allcott et al. 2020).

However, figures 2 through 4 must be adjusted for regional weather variation. The average decrease in retail and recreational time is unprecedented and clearly due to the COVID-19 pandemic. Nevertheless, regional variations in time use are often associated with weather rather than local product availability. A full study of the relationship between time usage and weather would probably require collecting detailed weather data from the National Oceanic and Atmospheric Association (NOAA) and modeling climate for each neighborhood.[12] However, such a modeling project would have been extremely difficult. For simplicity, this paper used the summary data available from wunderground.com, a public website which gives summary data on historical weather.

Figures 5, 6, and 7 show the associations between temperature, humidity, wind speed, and time use.[13] All three graphs show that retail and recreational time is highest during pleasant weather. On the other hand, precipitation has surprisingly little correlation with retail and recreational time. This paper is not focused on weather, so it does not explore the reasons why certain weather factors impact time usage and other weather factors do not. Instead, it simply calculates a daily weather adjustment for every region of the United States. These weather effects are similar before COVID-19 was recognized as a major health risk in mid-March and after the public became aware of it. As a result, it seems likely that the weather effects shown in Figures 5, 6, and 7 represent general seasonal trends rather than specific responses to the coronavirus pandemic. In addition, holidays like July 4th also contribute to seasonal changes in retail and recreational time.

Figure 8 shows average daily time spent at retail and recreational locations before and after adjustment for the weather and holidays. Both series follow the same general pattern of a sharp drop starting in the middle of March, a slow recovery from the middle of April until June, and stagnation afterwards. However, the adjusted series shows a slightly larger drop in March and a slightly slower recovery from April to June. In other words, the unadjusted reduction is retail and recreational time is actually an underestimate of the changes in time use due to the coronavirus pandemic.

---

12. For example, beach neighborhoods typically have more moderate weather than inland neighborhoods.

13. A simple linear regression would conflate seasonal weather variation and the COVID-19 pandemic. Figures 5, 6, and 7 are generated from a regression of time usage on weather after controlling for date, date interacted with normal regional time usage, date interacted with regional average income, date interacted with regional population, date interacted with the partisan differences studied by Allcott et al. (2020), region, and region interacted with nationwide time usage. The regression is run separately for each weekday. The coefficients from those regressions are then used to calculate the average regional weather effects shown in figures 5 to 7.

Figures 9 through 11 show adjusted regional time usage for March of 2020 and the second and third quarters of 2020. These figures are calculated by combining the unadjusted regional time usage shown in Figures 2, 3, and 3 with regional weather data and the calculated impact of that weather data. The most important result is that changes in time usage now depend more on metropolitan status and less on state characteristics. This shift occurs because the weather adjustment factors are not randomly distributed. Southern states like Florida typically have pleasantly moderate weather during the winter base period and unpleasantly hot and humid weather during spring and summer. Conversely, northern states like New York typically have unpleasantly cold weather during the winter base period and pleasantly moderate weather during spring and summer. As a result, the unadjusted differences in time usage shown in figures 2 through 4 understate the actual differences in product availability between southern states and northern states.

Appendix B shows normal retail and recreational time, unadjusted time use, and adjusted time use for every region tracked by BEA in its published regional accounts. On average, adjusted retail and recreational time fell by 16 minutes per day in March, 24 minutes per day in the second quarter, and 12 minutes per day in the third quarter. Based on the ATUS activity codes and expert judgment, the paper estimates that retail and recreational time would fall from 75 minutes per day to only 18 minutes per day under the full stay-in-place policy studied in Appendix A. Hence, the paper calculates that approximately 2 percent of normal consumer spending was unavailable in the first quarter, 11 percent was unavailable in the second quarter and 6 percent was unavailable in the third quarter.[14] Section 2 estimated that unavailable products have a theoretical inflation rate of at least 59 percent. Hence, the paper calculates that theoretical cost-of-living for the average U.S. consumer increased by at least 1.4 percentage points more than the CPI in the first quarter, at least 6.0 percentage points more than the CPI in the second quarter, and at least 2.8 percentage points less than the CPI in the third quarter.[15]

Figure 12 graphs theoretical inflation against regional income. There is a clear positive correlation between nominal income per capita in 2018 and theoretical inflation in the third quarter of 2020. This positive correlation between wealth and product availability remains even New York City or other regions with high coronavirus deaths are removed from the analysis and even if nominal income is deflated by BEA's previously published regional price parities. If the same positive correlation between nominal income and product availability holds in 2020, then regional income may be much more equally distributed when the theoretical regional cost-of-living is used as a deflator.

14. This calculation uses Appendix A's estimate that 26 percent of normal consumer spending is unavailable during a full stay-in-place policy. Each month is weighted by its number of days and product availability is assumed to be normal in January and February. Hence, first quarter product availability is (–16*31/90)*0.26/(75–18), second quarter product availability is –24*0.26/(75–18), and third quarter product availability is –12*0.26/(75–18).

15. The calculation uses unrounded numbers and weights each individual equally rather than each dollar equally.

Conclusion

This paper used previous research on the value of tourist amenities (Florida 2018a) and a newly developed model of tourist behavior to calculate a theoretical price for unavailable products during the COVID-19 pandemic. Based on that model of tourist behavior, the paper calculates that the theoretical price for unavailable products is at least 59 percent above their normal price. In this paper, the word "theoretical" designated a cost-of-living index which is consistent with theory on product unavailability. It does not imply any data problems or computational mistakes in other cost-of-living indexes.

The paper then calculated average product availability and aggregate theoretical prices for each region of the United States. Appendix A used the 2017 Economic Census and expert judgment to estimate the potential unavailability share for each consumer commodity tracked by BEA in the published table 2.4.5U. Appendix B then used COVID-19 Community Mobility Reports and other sources to estimate actual product unavailability for each region of the United States. Based on those estimates, the paper calculates that aggregate cost-of-living for the average U.S. consumer increased by at least 1.4 percentage points more than the CPI in the first quarter, at least 6.0 percentage points more than the CPI in the second quarter, and at least 2.8 percentage points less than the CPI in the third quarter. The faster inflation rates in the first two quarters of 2020 reinforces the measured declines in real consumption during those quarters and the slower inflation rate in the third quarter of 2020 reinforces the measured recovery in real consumption during the third quarter.

Bibliography

Allcott, H., L. Boxell, J. Conway, M. Getzkow, M. Thaler and D. Yang. 2020. “Polarization and Public Health: Partisan Differences in Social Distancing During the Coronavirus Pandemic,” National Bureau of Economic Research (NBER) Working Paper 26946. (August).

Andersen Consulting. 1996. “Where to Look for Incremental Sales Gains: The Retail Problem of Out-of-Stock Merchandise,” Study Conducted for the Coca-Cola Retailing Research Council.

Andersson, O., P. Campos-Mercade, F. Carlsson, F. Schneider, and E. Wengstrom. 2020. “The Individual Welfare Costs of Stay-At-Home Policies,” LUND University Working Paper 9. (Lund, Sweden: May).

Aten, B. and R. D’Souza, R. 2008. “Regional Price Parities, Comparing Price Level Differences Across Geographic Areas,” *Survey of Current Business* 88 (November 2008).

Barret, G., P. Levell, and K. Milligan. 2015. “A Comparison of Micro and Macro Expenditure Measures across Countries Using Differing Survey Methods.” In *Improving the Measurement of Consumer Expenditures*. Chicago: University of Chicago Press.

Becker, G. 1965. “A Theory of the Allocation of Time,” *Economic Journal* 75, no. 299 (September): 493–517.

Berndt, E., L. Bui, D. Lucking-Reiley, and G. Urban. 1996. “The Roles of Marketing, Product Quality, and Price Competition in the Growth and Composition of the U.S. Antiulcer Drug Industry.” In *The Economics of New Goods*. Chicago: University of Chicago Press.

Bradley, R. 2003. “Price Index Estimation Using Price Imputations for Unsold Items.” In *Scanner Data and Price Indexes*. Chicago: University of Chicago Press.

Bridgman, B., A. Dugan, M. Lal, M. Osborne, and S. Villones. 2012. “Accounting for Household Production in the National Accounts, 1965–2010,” *Survey of Current Business* 92 (May 2012): 23–36.

Broda, C. and D. Weinstein. 2010. “Product Creation and Destruction: Evidence and Price Implications,” *American Economic Review* 100, no. 3 (June): 691–723.

Bureau of Labor Statistics. 2018. “BLS Handbook of Methods, Chapter 17. The Consumer Price Index”, Accessed March 30, 2020. www.bls.gov/opub/hom/pdf/cpihom.pdf.

Bureau of Labor Statistics. 2019. "Quality Adjustment in the CPI," January 15, 2019. Accessed March 30, 2020. www.bls.gov/cpi/quality-adjustment/.

Bureau of Labor Statistics. 2020a. "Consumer Price Index—September 2020," October 13, 2020. Accessed October 14, 2020. www.bls.gov/news.release/pdf/cpi.pdf.

Bureau of Labor Statistics. 2020b. "Effects of Covid-19 Pandemic and Response on the Consumer Price Index," August 12, 2020. Accessed August 30, 2020. www.bls.gov/covid19/effects-of-covid-19-pandemic-on-consumer-price-index.htm.

Carlino, G. and A. Saiz. 2019. "Beautiful City: Leisure Amenities and Urban Growth," Philadelphia Federal Reserve Working Paper 19–16. (March).

Cavallo, A. 2020. "Inflation with COVID Consumption Baskets," NBER Working Paper 27352. (July).

Cavallo, A. and Kryvtsov. 2020. "Stockouts and Prices during Covid" Full paper not available yet, but discussed in public slides at www.suomenpankki.fi/globalassets/en/research/seminars-and-conferences/conferences-and-workshops/documents/cepr2020/cbf---covid-prices-and-stocks-002.pdf_cavallo.pdf.

Carvalho, V.M., J.R. Garcia, S. Hansen, Á. Ortiz, T. Rodrigo, J.V. Rodríguez Mora and J. Ruiz. 2020. "Tracking the COVID-19 Crisis with High-Resolution Transaction Data," Cambridge-INET Working Paper Series No: 2020/16, University of Cambridge. (April).

Charters, H. 2019. "Tourism Spending in Louisiana Parishes 2018," *Report by the University of New Orleans Hospitality Research Center*, posted May 2019. Accessed August 18, 2020. www.crt.state.la.us/Assets/Tourism/research/documents/2018-2019/Louisiana%20Parishes%20Spending%20Report%202018%20Rev.pdf.

Cowen, T. (2020) "Pandemics Upend Classic Measures of Inflation," Bloomberg Businessweek, last updated August 26, 2020. Accessed August 27, 2020. www.bloomberg.com/opinion/articles/2020-08-26/inflation-in-the-covid-19-pandemic-is-measured-by-more-than-food-prices.

Couture, V., C. Gaubert, J. Handbury, and E. Hurst. 2020. "Income Growth and the Distributional Effects of Urban Spatial Sorting," manuscript available at erikhurst.com/wp-content/uploads/2020/02/welfare-implications-urban-current.pdf.

Dave, D., A. Friedson, K. Matsuzawa, and J. Sabia. 2020. "When Do Shelter-in-Place Orders Fight COVID-19 Best? Policy Heterogeneity Across States and Adoption Time," NBER Working Paper 27091. (June).

Diewert, W.E., and K. Fox. 2020. "Measuring Real Consumption and CPI Bias Under Lockdown Conditions," NBER Working Paper 27144. (May).

Diewert, W. E. 2001. "The Consumer Price Index and Index Number Theory: A Survey," Vancouver School of Economics Discussion Paper 2001–02. (February).

Diewert, W. E. 2003. "Hedonic Regressions. A Consumer Theory Approach," In *Scanner Data and Price Indexes*, Chicago: University of Chicago Press.

Diewert, W. E. and R. Feenstra. 2019. "Estimating the Benefits of New Products," NBER Working Paper 25991. (June).

Diewert, W. E., K. Fox, and P. Schreyer. 2019. "Experimental Economics and the New Commodities Problem," Vancouver School of Economics Discussion Paper 2019–4. (March).

Feenstra, R. 1994. "New Product Varieties and the Measurement of International Prices," *American Economic Review* 84, no. 1. (March): 157–177.

Figueroa, E. and B. Aten. 2019. "Estimating Price Levels for Housing Rents in the Regional Price Parities," *Survey of Current Business* 99 (June).

Florida, R. 2018a. "The Global Tourism Backlash," *Citylab*, August 7, 2018. Accessed August 18, 2020. www.bloomberg.com/news/articles/2018-08-07/the-global-rise-in-tourism-has-prompted-a-backlash.

Florida, R. 2018b. "How Urban Core Amenities Drive Gentrification and Increase Inequality," *Citylab*, December 12, 2018. Accessed April 23, 2020. www.bloomberg.com/news/articles/2018-12-13/urban-amenities-lure-the-rich-income-inequality-follows.

Franks, C. and S. Osborne. 2019. "U.S. Travel and Tourism Satellite Account for 1998–2018," *Survey of Current Business* 99 (November 2019).

Gasparo, A. and S. Stamm (2020) "Why Are Some Groceries Still So Hard to Find During Covid?" *Wall Street Journal*, last updated August 10, 2020. Accessed August 28, 2020. www.wsj.com/articles/why-are-some-groceries-still-so-hard-to-find-during-covid-11597069761.

Glaeser, E., J. Kolko, and A. Saiz. 2001. "Consumer City," *Journal of Economic Geography* 1, no. 1 (January): 27–50.

Glaeser, E. and J. Gyourko. 2018. "The Economic Implications of Housing Supply," *Journal of Economic Perspectives* 32, no.1. (Winter): 3–30.

Gomes, H. 2018. "Evaluation of Patterns of Missing Prices in CPI Data," *JSM 2018–Survey Research Methods Section*, Accessed August 30, 2020. www.bls.gov/osmr/research-papers/2018/pdf/st180110.pdf.

Goolsbee, A. and A. Petrin. 2004. "The Consumer Gains from Direct Broadcast Satellites and The Competition with Cable TV," *Econometrica* 72, no. 2. (January): 351–381.

Greenlees, J. and R. McClelland. 2008. "New Evidence on Outlet Substitution Effects in Consumer Price Index Data," BLS Working Papers 421. (November).

Gyourko, J., C. Mayer, and T. Sinai. 2013. "Superstar Cities," *American Economic Journal: Economic Policy* 5, no. 4. (November): 167–199.

Handbury, J. and D. Weinstein. 2015. "Goods Prices and Availability in Cities," *Review of Economic Studies* 82, no. 1. (January): 258–296.

Hausman, J. 1997. "Valuation of New Goods Under Perfect and Imperfect Competition." In *The Economics of New Goods*, Chicago: University of Chicago Press.

Hausman, J. 1999. "Cellular Telephone, New Products, and the CPI," *Journal of Business & Economic Statistics*, American Statistical Association 17, no. 2. (April): 188–194.

Hausman, J. and E. Liebtag. 2009. "CPI Bias from Supercenters: Does the BLS Know that Wal-Mart Exists?" In *Price Index Concepts and Measurement*, Chicago: University of Chicago Press.

Lee, R. 2020. "Some Small Businesses are Reopening Illegally in NYC," *Spectrum News*, May 25, 2020 Accessed August 18, 2020. www.ny1.com/nyc/all-boroughs/coronavirus/2020/05/25/some-small-businesses-are-reopening-illegally-in-nyc.

Matsa, D. 2011. "Competition and Product Quality in the Supermarket Industry," *The Quarterly Journal of Economics* 126, no. 3. (August): 153–1591.

Meyer, K. 2020. "Police Can Now Shut Down Your 'Non-Life-Sustaining' Business, But They'd Rather Not," *WHYY.org* article, March 25, 2020. Accessed March 30, 2020. www.witf.org/2020/03/25/police-can-now-shut-down-your-non-life-sustaining-business-but-theyd-rather-not/.

Molla, R. 2020. “Chart: How Coronavirus is Devasting the Restaurant Industry, Mandatory Closures Will Only Make It Worse,” *Vox*, March 16, 2020. Accessed April 23, 2020. www.vox.com/recode/2020/3/16/21181556/coronavirus-chart-restaurant-business-local.

Moulton, B. 2001. “The Expanding Role of Hedonic Methods in the Official Statistics of the United States,” BEA Working Paper 2001–6 (Washington, D.C.: BEA, November 2001), www.bea.gov/research/papers/2001/expanding-role-hedonic-methods-official-statistics-united-states.

Nordhaus, W. 1996. “Do Real-Output and Real-Wage Measures Capture Reality? The History of Lighting Suggests Not,” In *The Economics of New Goods*, Chicago: University of Chicago Press.

Paredes, D. and S. Loveridge. 2014. “How Large is the Rural Cost Advantage? A Big Mac Index for the United States,” *National Agricultural & Rural Development Policy Brief* 36. December.

Passero, W., T. Garner, and C. McCully. 2015. “Understanding the Relationship: CE Survey and PCE.” In *Improving the Measurement of Consumer Expenditures*, Chicago: University of Chicago Press.

Petrin, A. 2002. “Quantifying the Benefits of New Products: The Case of the Minivan,” *Journal of Political Economy* 110, no. 4 (August): 705–729.

Reinsdorf, M. 1993. “The Effect of Outlet Price Differentials on the U.S. Consumer Price Index.” In *Price Measurements and Their Uses*, Chicago: University of Chicago Press.

Reinsdorf, M. and J. Triplett. 2009. “A Review of Reviews: Ninety Years of Professional Thinking About the Consumer Price Index” In *Price Index Concepts and Measurement*, Chicago: University of Chicago Press.

Shapiro, M. and D. Wilcox. 1996. “Mismeasurement in the Consumer Price Index: An Evaluation.” In *NBER Macroeconomics Annual* 1996, Chicago: University of Chicago Press.

Sherman, A. (2020) “ESPN Scrambling to Figure Out Programming While Live Sports Shut Down Indefinitely,” *CNBC* online article, posted March 13th, 2020 and accessed March 20th, 2020.

Stone, L. 2020. “Lockdowns Don’t Work,” *Public Discourse*, April 21, 2020. Accessed April 23, 2020. www.aei.org/articles/lockdowns-dont-work/.

Stroebel, J. and J. Vavra. 2019. “House Prices, Local Demand, and Retail Prices,” *Journal of Political Economy* 127, no. 3 (June): 1391–1436.

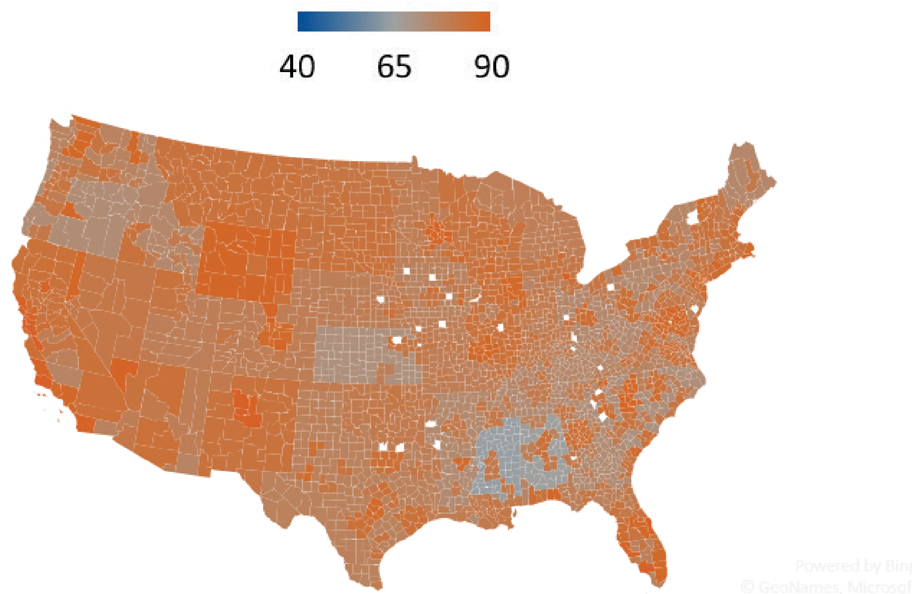
Takashi, P. 2020. “Even Struggling Retailers are Now Voluntarily Closing During Coronavirus Pandemic,” *Houston Chronicle*, March 23, 2020. Accessed April 23, 2020. www.houstonchronicle.com/business/retail/article/Even-struggling-retailers-are-now-voluntarily-15151194.php.

Tarrant, M. 2015. “The Effects of Anti-Price Gouging Laws in the Wake of a Hurricane,” manuscript available at: scholarworks.montana.edu/xmlui/bitstream/handle/1/9083/TarrantM0515.pdf;sequence=3.

Tognotti, E. 2013. “Lessons from the History of Quarantine, from Plague to Influenza A,” *Emerging Infectious Diseases* 19, no. 2 (February): 254–259.

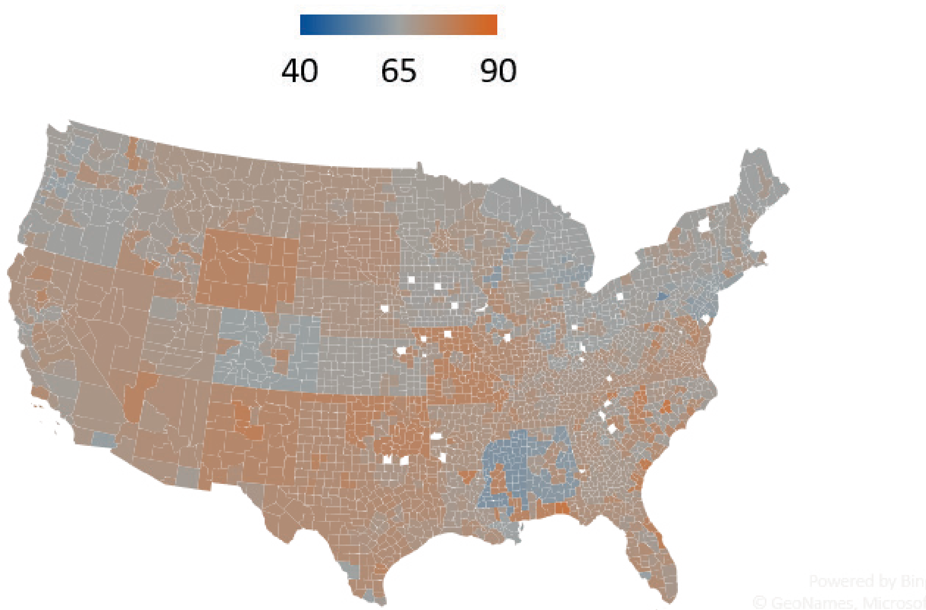
Figures

Figure 1. Mean Daily Minutes at Retail & Recreational Locations, 2003–2018



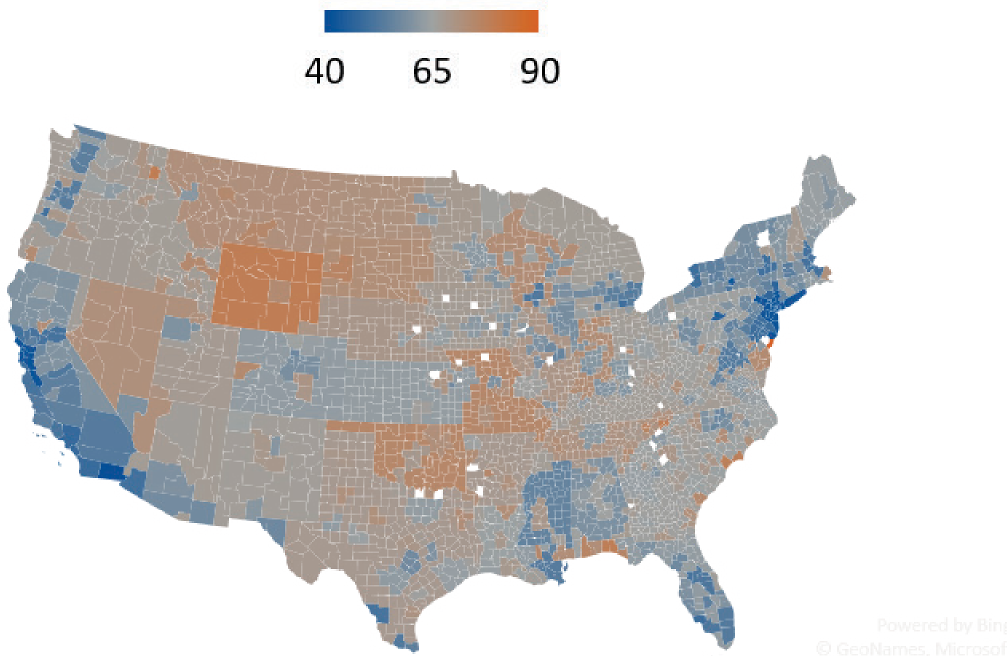
Calculated from American Time Use Survey (ATUS) data

Figure 2. Mean Daily Minutes at Retail & Recreational Locations, March 2020



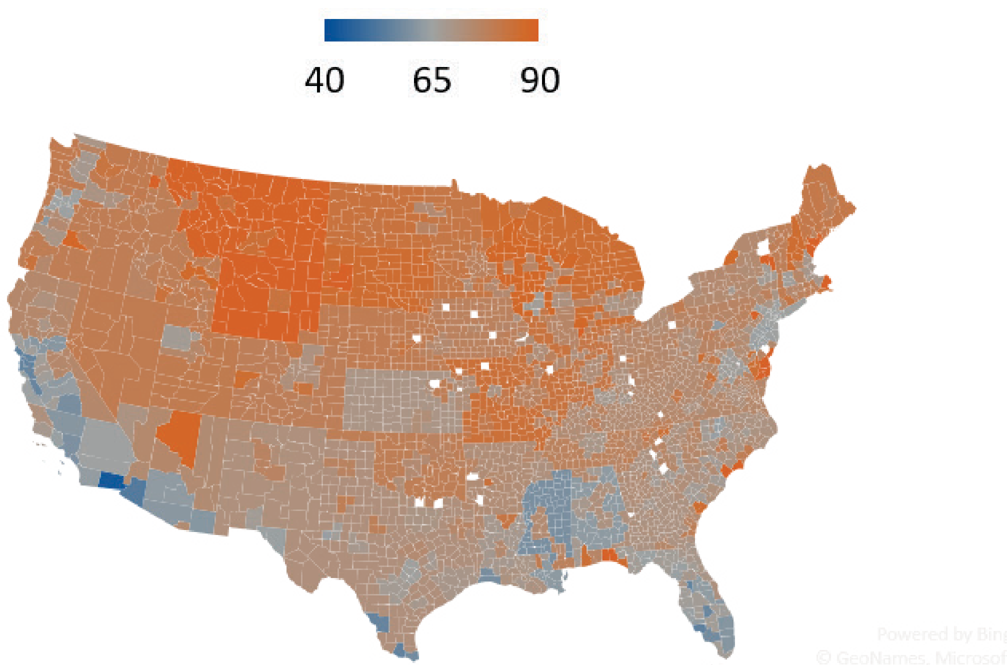
Calculated from ATUS data and COVID-19 Community Mobility Reports

Figure 3. Mean Daily Minutes at Retail & Recreational Locations, 2020 Q2



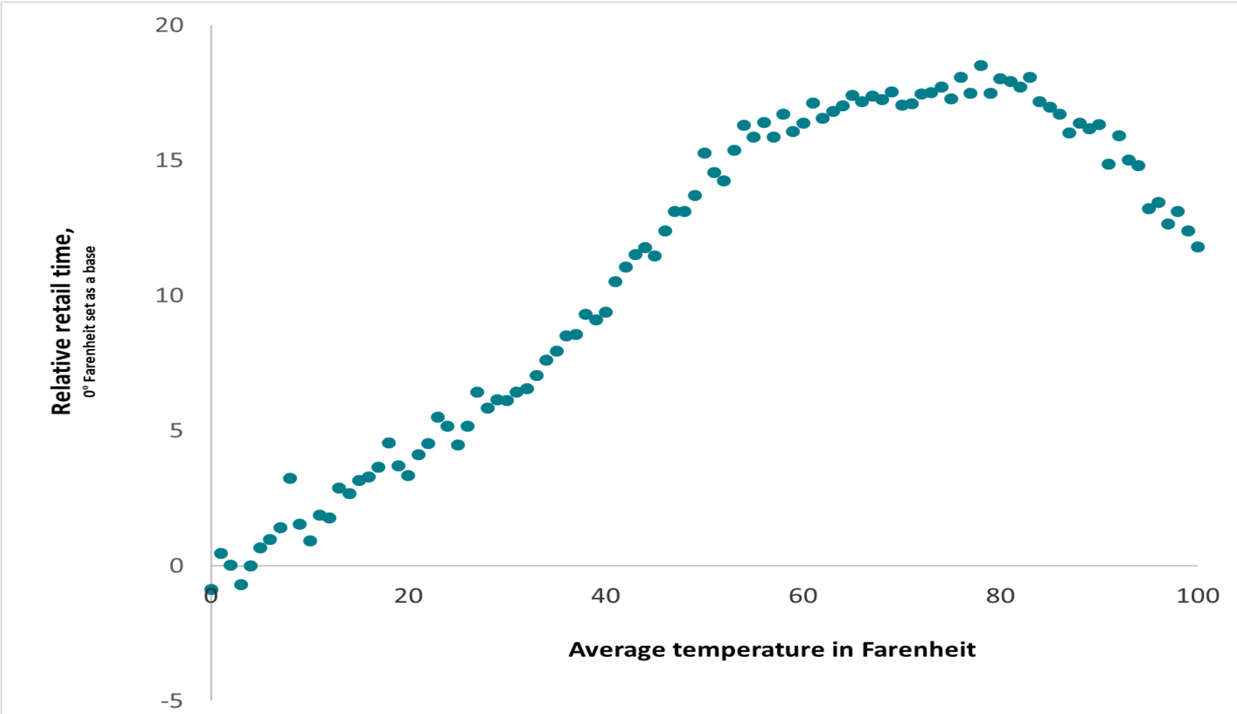
Calculated from ATUS data and COVID-19 Community Mobility Reports

Figure 4. Mean Daily Minutes at Retail & Recreational Locations, 2020 Q3



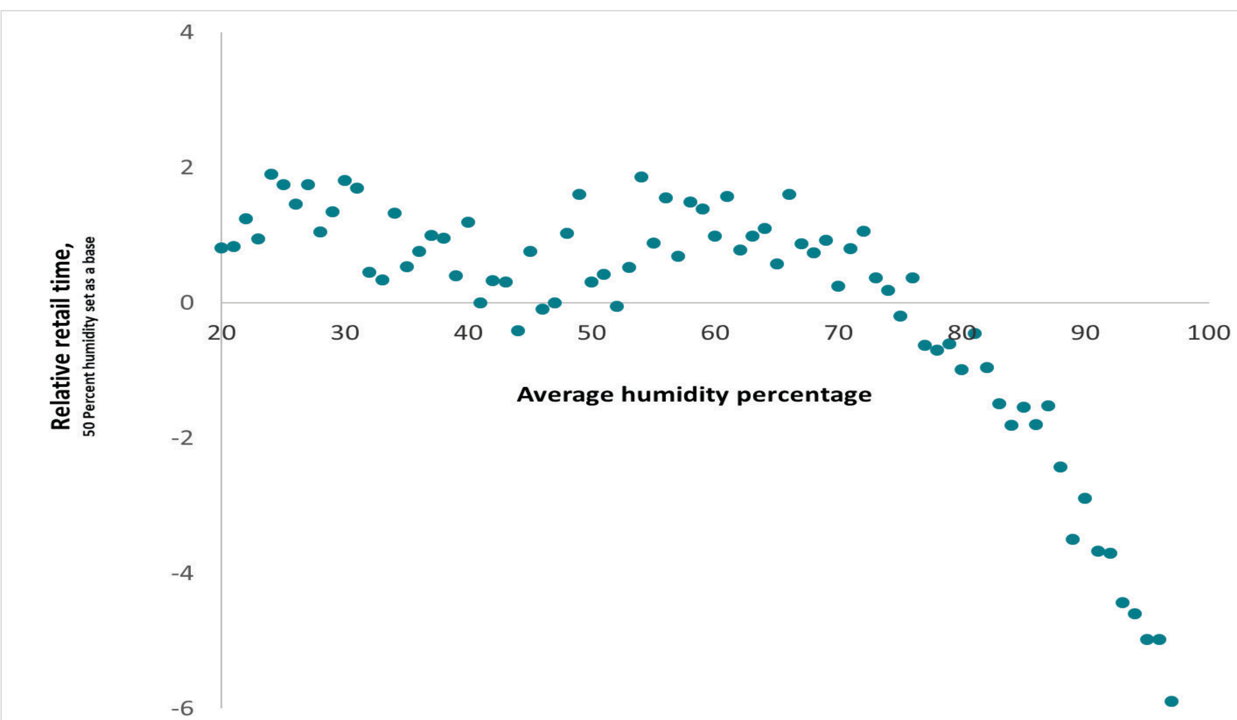
Calculated from ATUS data and COVID-19 Community Mobility Reports

Figure 5. Association of Temperature with Retail and Recreational Time



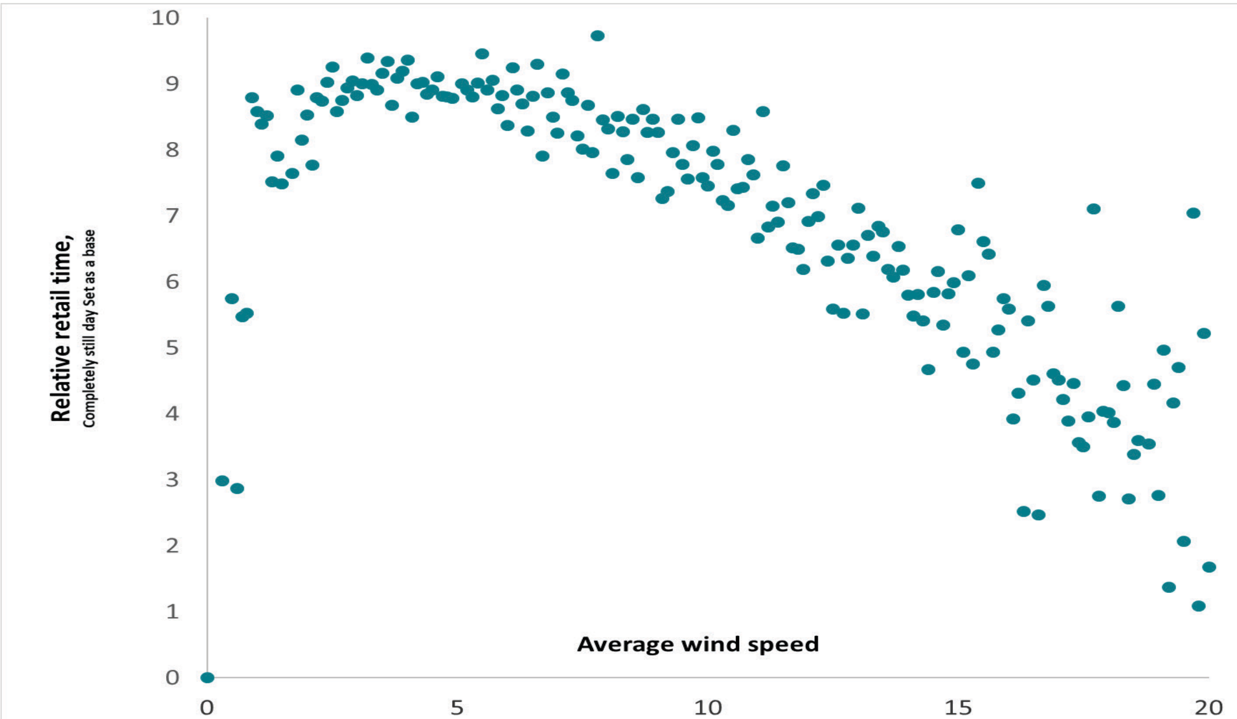
Calculated from the ATUS, COVID-19 Community Mobility Reports, and Wunderground weather

Figure 6. Association of Humidity with Retail and Recreational Time



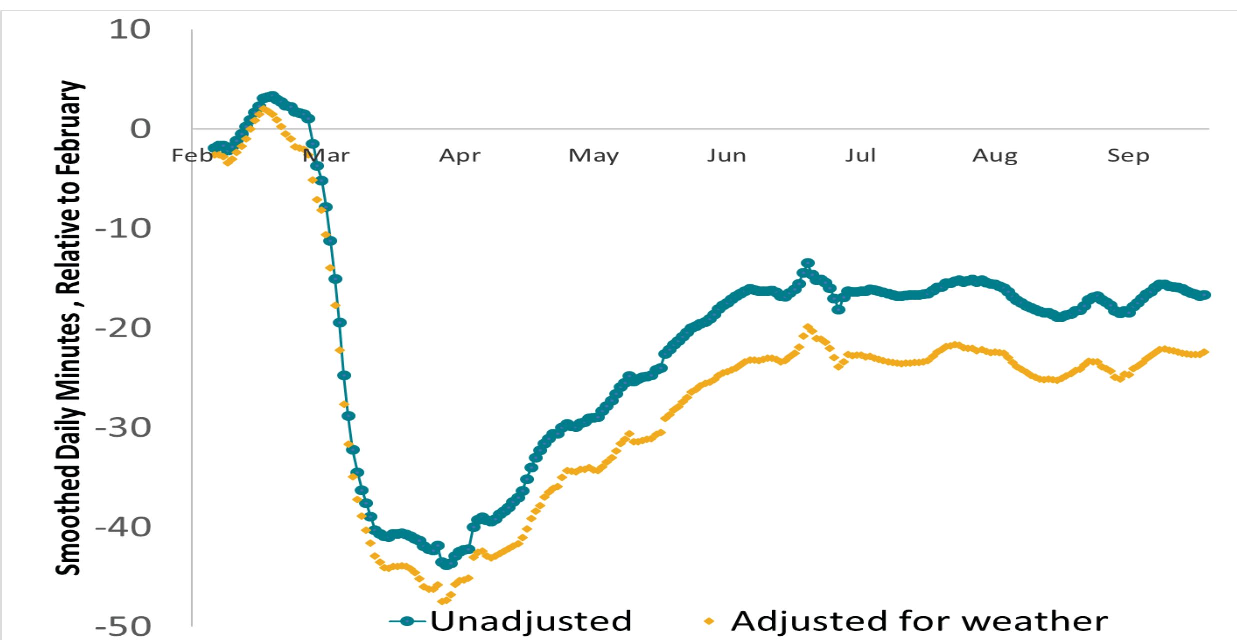
Calculated from the ATUS, COVID-19 Community Mobility Reports, and Wunderground weather

Figure 7. Association of Wind Speed with Retail and Recreational Time



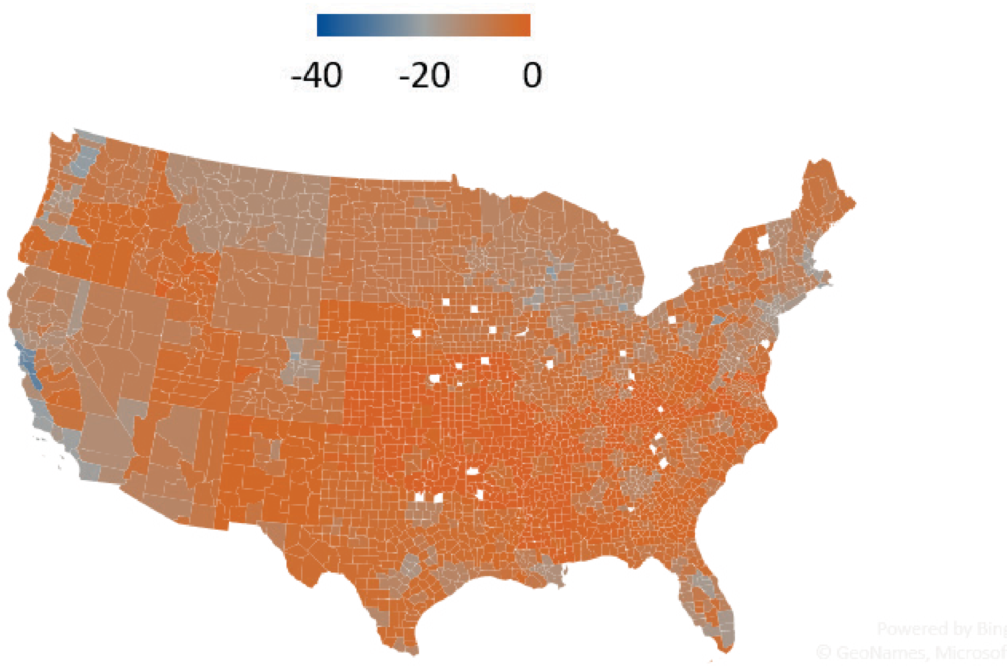
Calculated from the ATUS, COVID-19 Community Mobility Reports, and Wunderground weather

Figure 8. Daily Adjusted and Unadjusted Mobility Since February 15, 2020



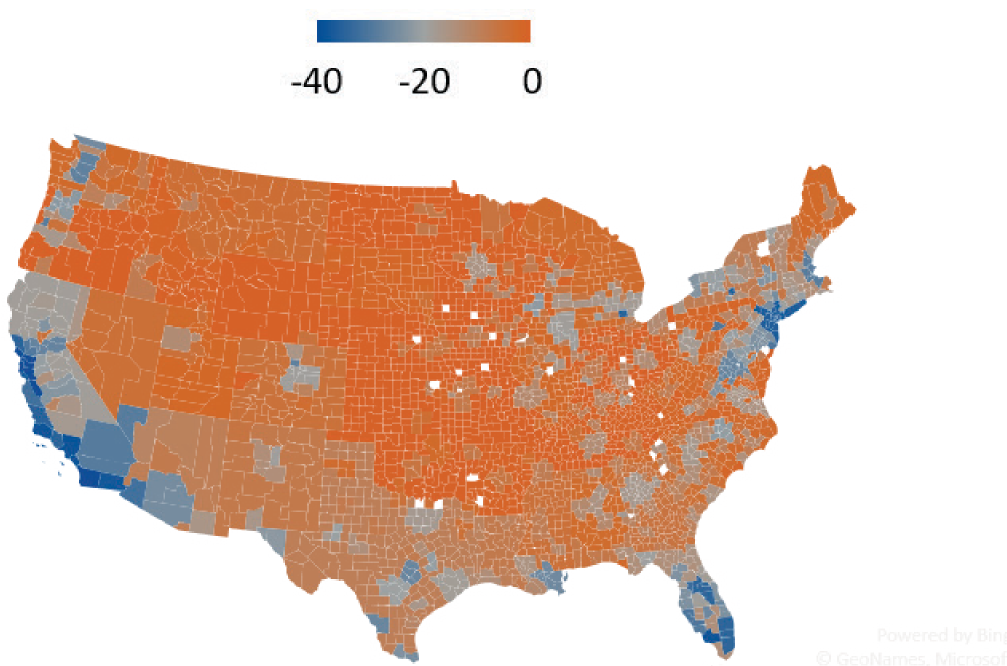
Calculated from the ATUS, COVID-19 Community Mobility Reports, and Wunderground weather

Figure 9. Time Usage in March 2020 Relative to Normal, Adjusted Daily Minutes



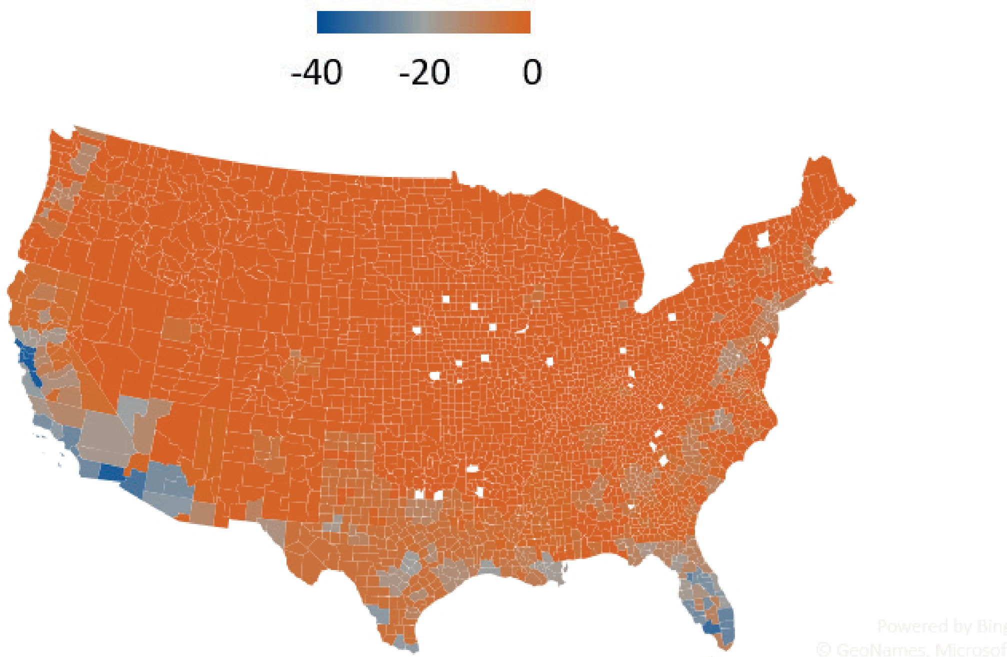
Calculated from COVID-19 Community Mobility Reports and Wunderground's weather data

Figure 10. Time Usage in Q2 2020 Relative to Normal, Adjusted Daily Minutes



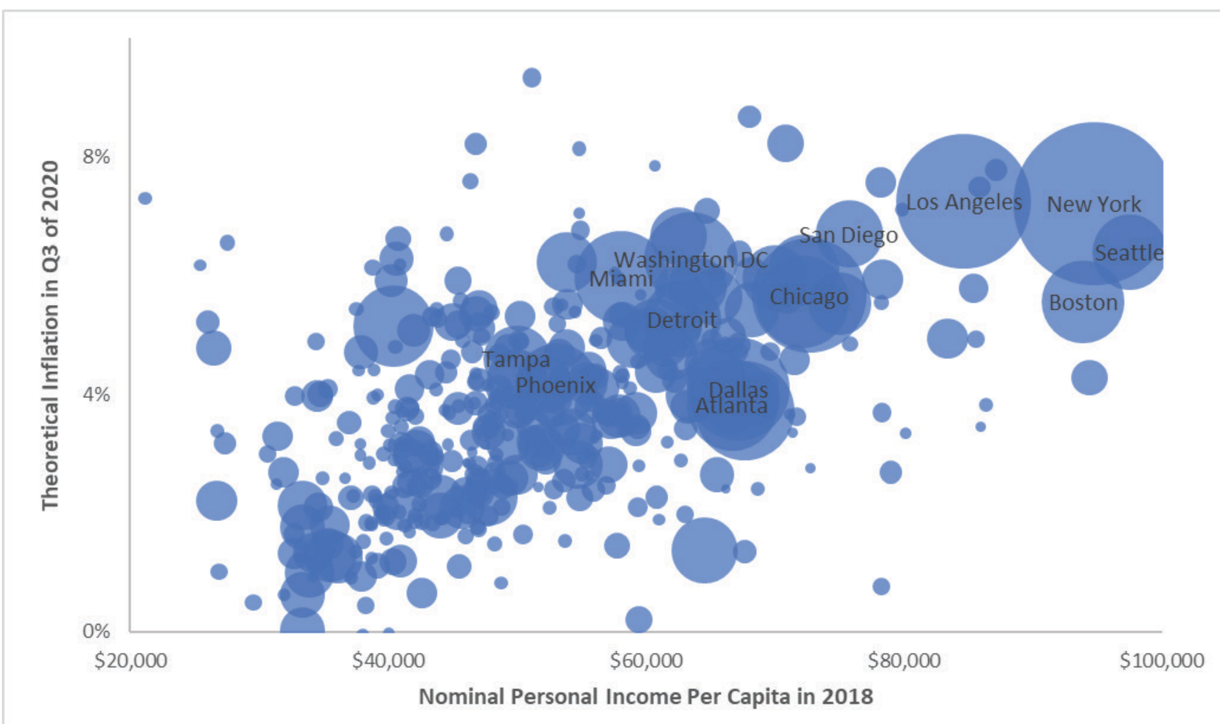
Calculated from COVID-19 Community Mobility Reports and Wunderground's weather data

Figure 11. Time Usage in Q3 2020 Relative to Normal, Adjusted Daily Minutes



Calculated from COVID-19 Community Mobility Reports and Wunderground's weather data

Figure 12. Theoretical Inflation Rates in Q3 and Income Per Capita in 2018



Calculated from COVID-19 Community Mobility Reports, Wunderground's weather, and BEA's regional data

Appendix A. Estimates of Unavailability by Product[16]

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
0	0	New domestic autos	51,947	Goods
0	0	New foreign autos	18,350	Goods
0	0	New light trucks	211,787	Goods
0	0	Net transactions in used autos	31,253	Goods
0	0	Used auto margin	30,278	Goods
0	0	Employee reimbursement	–1,735	Goods
0	0	Net transactions in used trucks	60,110	Goods
0	0	Used truck margin	28,715	Goods
0	0	Tires	30,019	Goods
1	3	Accessories and parts	42,919	Goods
72	3	Furniture	115,899	Goods
61	3	Clocks, lamps, lighting fixtures, and other household decorative items	39,930	Goods
98	3	Carpets and other floor coverings	22,867	Goods
52	3	Window coverings	21,023	Goods
84	3	Major household appliances	46,878	Goods
30	3	Small electric household appliances	8,514	Goods
24	3	Dishes and flatware	18,452	Goods
24	3	Nonelectric cookware and tableware	21,177	Goods
82	3	Tools, hardware, and supplies	25,898	Goods
98	3	Outdoor equipment and supplies	4,108,	Goods
62	3	Televisions	30,774	Goods
82	3	Other video equipment	14,887	Goods
46	3	Audio equipment	18,941	Goods
40	3	Audio discs, tapes, vinyl, and permanent digital downloads	3,717	Goods
13	3	Video discs, tapes, and permanent digital downloads	12,355	Goods
41	3	Photographic equipment	5,311	Goods
37	3	Personal computers/tablets and peripheral equipment	48,203	Goods
2	3	Computer software and accessories	81,350	Goods
37	3	Calculators, typewriters, and other information processing equipment	704	Goods
54	3	Sporting equipment, supplies, guns, and ammunition (part of 80)	71,888	Goods
84	3	Motorcycles	12,165	Goods
86	3	Bicycles and accessories	5,841	Goods
96	0	Pleasure boats	15,419	Goods
100	0	Pleasure aircraft	1,555	Goods

16. This table is based on BEA's published Table 2.4.5U, news articles discussing product unavailability and shortages, Economic Census data showing online shares, and other sources. In order to save space, Appendix A only lists products which are in the narrowest commodity groups tracked in Table 2.4.5U.

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
96	0	Other recreational vehicles	25,051	Goods
43	8	Recreational books (part of 90)	20,133	Goods
80	8	Musical instruments (part of 80)	5,880	Goods
73	0	Jewelry	59,600	Goods
83	0	Watches	12,826	Goods
45	10	Therapeutic medical equipment	30,199	Goods
61	10	Corrective eyeglasses and contact lenses	35,938	Goods
60	8	Educational books (96)	10,501	Goods
56	8	Luggage and similar personal items (part of 119)	28,792	Goods
45	8	Telephone and related communication equipment	30,261	Goods
0	7	Cereals	51,975	Goods
0	7	Bakery products	88,210	Goods
0	7	Beef and veal	46,198	Goods
0	7	Pork	33,706	Goods
0	7	Other meats	33,460	Goods
0	7	Poultry	54,680	Goods
0	7	Fish and seafood	14,507	Goods
0	7	Fresh milk	23,946	Goods
0	7	Processed dairy products	48,860	Goods
0	7	Eggs	12,510	Goods
0	7	Fats and oils	22,523	Goods
0	7	Fruit (fresh)	38,833	Goods
0	7	Vegetables (fresh)	47,199	Goods
0	7	Processed fruits and vegetables	29,162	Goods
1	7	Sugar and sweets	45,212	Goods
0	7	Food products, not elsewhere classified	149,439	Goods
0	7	Coffee, tea, and other beverage materials	15,757	Goods
1	7	Mineral waters, soft drinks, and vegetable juices	77,467	Goods
0	7	Spirits	30,267	Goods
0	7	Wine	43,239	Goods
1	7	Beer	62,569	Goods
0	0	Food produced and consumed on farms (6)	433	Goods
71	0	Women's and girls' clothing (10)	177,056	Goods
61	0	Men's and boys' clothing (11)	100,034	Goods
49	0	Children's and infants' clothing (12)	18,379	Goods
80	0	Clothing materials	4,343	Goods
0	0	Standard clothing issued to military personnel	388	Goods
77	0	Shoes and other footwear	79,765	Goods
0	0	Gasoline and other motor fuel	283,840	Goods
2	0	Lubricants and fluids	7,460	Goods
5	0	Fuel oil	16,188	Goods
0	0	Other fuels	1,506	Goods

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
0	10	Prescription drugs	417,043	Goods
0	10	Nonprescription drugs	68,982	Goods
5	10	Other medical products	5,873	Goods
29	8	Games, toys, and hobbies	69,218	Goods
37	8	Pets and related products	64,774	Goods
61	8	Flowers, seeds, and potted plants	34,905	Goods
41	8	Film and photographic supplies	1,587	Goods
12	20	Household cleaning products	37,181	Goods
1	40	Household paper products	38,147	Goods
33	8	Household linens	39,261	Goods
84	8	Sewing items	1,798	Goods
31	8	Miscellaneous household products	19,203	Goods
7	8	Hair, dental, shaving, and miscellaneous personal care products except electrical products	72,878	Goods
47	8	Cosmetic / perfumes / bath / nail preparations and implements	50,621	Goods
30	8	Electric appliances for personal care	8,834	Goods
13	8	Tobacco (127)	97,304	Goods
1	8	Newspapers and periodicals	43,161	Goods
35	8	Stationery and miscellaneous printed materials	24,738	Goods
22	8	Government employees’ expenditures abroad	7,165	Goods
22	8	Private employees’ expenditures abroad	1,404	Goods
22	8	Less: Personal remittances in kind to nonresidents	–1,609	Goods
0	–	Tenant-occupied mobile homes	12,809	Housing
0	–	Tenant-occupied stationary homes	554,251	Housing
0	–	Tenant landlord durables	8,207	Housing
0	–	Owner-occupied mobile homes	25,870	Housing
0	–	Owner-occupied stationary homes	1,512,455	Housing
0	–	Rental value of farm dwellings (22)	17,851	Housing
0	–	Group housing (23)	1,854	Housing
0	–	Water supply and sewage maintenance	73,415	Housing
0	–	Garbage and trash collection	26,845	Housing
0	–	Electricity (27)	177,624	Housing
0	–	Natural gas (28)	48,334	Housing
50	–	Physician services (44)	538,024	Service
83	–	Dental services (45)	126,638	Service
50	–	Home health care	108,838	Service
50	–	Medical laboratories	37,504	Service
50	–	Specialty outpatient care facilities and health and allied services	149,516	Service
66	–	All other professional medical services	60,347	Service
30	–	Nonprofit hospitals’ services to households	708,151	Service
30	–	Proprietary hospitals	126,480	Service

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
30	–	Government hospitals	209,121	Service
7	–	Nonprofit nursing homes' services to households	58,271	Service
7	–	Proprietary and government nursing homes	125,391	Service
6	–	Motor vehicle maintenance and repair (60)	179,855	Service
0	–	Auto leasing	35,173	Service
0	–	Truck leasing	27,832	Service
0	–	Motor vehicle rental	17,937	Service
0	–	Parking fees and tolls	24,861	Service
75	–	Railway transportation	1,286	Service
75	–	Intercity buses	1,142	Service
75	–	Taxicabs and ride sharing services	10,782	Service
75	–	Intracity mass transit	20,685	Service
75	–	Other road transportation service	19,726	Service
75	–	Air transportation (64)	97,751	Service
75	–	Water transportation (65)	3,298	Service
100	–	Membership clubs and participant sports centers	54,418	Amenity
81	–	Amusement parks, campgrounds, and related recreational services	61,917	Amenity
100	–	Motion picture theaters	13,436	Amenity
100	–	Live entertainment, excluding sports	32,617	Amenity
100	–	Spectator sports	26,127	Amenity
100	–	Museums and libraries	9,444	Amenity
2	–	Cable, satellite, and other live television services	99,267	Service
50	–	Photo processing	1,894	Service
100	–	Photo studios	7,631	Service
8	–	Repair and rental of audio-visual, photographic, and information processing equipment	7,967	Service
0	–	Video streaming and rental	16,021	Service
0	–	Audio streaming and radio services (including satellite radio)	8,083	Service
100	–	Casino gambling	105,480	Amenity
15	–	Lotteries	26,376	Service
100	–	Pari-mutuel net receipts	4,036	Amenity
59	–	Veterinary and other services for pets	45,145	Service
100	–	Package tours	12,683	Service
100	–	Maintenance and repair of recreational vehicles and sports equipment	5,986	Service
50	–	Elementary and secondary school lunches	7,199	Service
100	–	Higher education school lunches	17,752	Service
46	–	Meals at limited service eating places	324,525	Service
91	–	Meals at other eating places	287,531	Service
98	–	Meals at drinking places	5,277	Service
100	–	Alcohol in purchased meals	104,465	Service

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
100	–	Food supplied to civilians	18,995	Service
0	–	Food supplied to military	2,036	Service
100	–	Hotels and motels	109,843	Housing
100	–	Housing at schools	36,096	Housing
0	–	Commercial banks	137,781	Service
0	–	Other depository institutions and regulated investment companies	134,427	Service
0	–	Pension funds	55,303	Service
0	–	Financial service charges and fees	106,167	Service
0	–	Exchange-listed equities	2,208	Service
0	–	Other direct commissions	6,107	Service
0	–	Over-the-counter equity securities	1,025	Service
0	–	Other imputed commissions	10,239	Service
0	–	Mutual fund sales charges	9,407	Service
0	–	Portfolio management and investment advice services	187,434	Service
0	–	Trust, fiduciary, and custody activities	14,977	Service
0	–	Life insurance	91,188	Service
0	–	Household insurance premiums and premium supplements	21,399	Service
0	–	Less: Household insurance normal losses	–10,894	Service
0	–	Medical care and hospitalization	176,514	Service
0	–	Income loss	3,352	Service
0	–	Workers' compensation	32,786	Service
0	–	Net motor vehicle and other transportation insurance	72,977	Service
0	–	Land-line telephone services, local charges	20,394	Service
0	–	Land-line telephone services, long-distance charges	9,414	Service
0	–	Cellular telephone services	122,172	Service
0	–	First-class postal service (by U.S. Postal Service)	6,081	Service
0	–	Other delivery services (by non-U.S. postal facilities)	6,569	Service
0	–	Internet access	71,247	Service
100	–	Proprietary and public higher education	105,515	Service
100	–	Nonprofit private higher education services to households	76,036	Service
100	–	Elementary and secondary schools	33,585	Service
100	–	Day care and nursery schools	12,953	Service
100	–	Commercial and vocational schools	51,745	Service
1	–	Legal services	106,822	Service
0	–	Tax preparation and other related services	25,065	Service
25	–	Employment agency services	1,628	Service
25	–	Other personal business services	10,493	Service
0	–	Labor organization dues	13,349	Service

Unavailable share (percent)	Shortage share (percent)	Commodity name	Nominal spending in 2017	Category
0	–	Professional association dues	10,144	Service
35	–	Funeral and burial services	27,921	Service
100	–	Hairdressing salons and personal grooming establishments	72,105	Service
79	–	Miscellaneous personal care services	66,243	Service
0	–	Laundry and dry-cleaning services	11,867	Service
100	–	Clothing repair, rental, and alterations	3,637	Service
41	–	Repair and hire of footwear	364	Service
100	–	Child care	38,073	Service
7	–	Homes for the elderly	29,066	Service
7	–	Residential mental health and substance abuse	12,292	Service
50	–	Individual and family services	57,907	Service
50	–	Vocational rehabilitation services	10,457	Service
0	–	Community food and housing / emergency / other relief services	10,739	Service
50	–	Other social assistance, not elsewhere classified	6,032	Service
50	–	Social advocacy and civic and social organizations	15,315	Service
50	–	Religious organizations' services to households	7,586	Service
50	–	Foundations and grantmaking and giving services to households	5,530	Service
41	–	Domestic services	26,546	Service
0	–	Moving, storage, and freight services	18,124	Service
100	–	Repair of furniture, furnishings, and floor coverings	1,329	Service
0	–	Repair of household appliances	7,405	Service
15	–	Other household services	29,166	Service
100	–	Passenger fares for foreign travel	52,338	Service
100	–	U.S. travel outside the United States	90,859	Service
100	–	U.S. student expenditures	10,817	Service
100	–	Less: Foreign travel in the United States	–153,011	Service
100	–	Less: Medical expenditures of foreigners	–1,098	Service
100	–	Less: Expenditures of foreign students in the United States	–42,191	Service

Appendix B. Calculated Retail and Recreational Time for Every Region in the United States

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
01999	Alabama (nonmetropolitan portion)	66	62	49	63	66	65	62	61	59	47	61	63	61	59	57
02999	Alaska (nonmetropolitan portion)	85	73	55	79	100	114	101	91	65	42	59	78	91	80	73
04999	Arizona (nonmetropolitan portion)	79	72	53	73	76	75	73	74	71	51	71	72	71	70	70
05999	Arkansas (nonmetropolitan portion)	75	70	56	72	77	76	72	71	66	51	67	70	69	66	65
06999	California (nonmetropolitan portion)	84	71	51	59	72	76	75	73	69	47	56	67	72	70	68
08999	Colorado (nonmetropolitan portion)	79	65	47	64	77	84	76	75	57	38	54	65	71	64	63
09999	Connecticut (nonmetropolitan portion)	78	66	49	68	78	79	80	79	62	45	63	69	70	73	72
10180	Abilene, TX	83	76	58	76	82	77	79	78	74	55	74	78	73	76	74
10420	Akron, OH	78	65	48	63	75	75	74	74	60	42	55	64	63	64	63
10500	Albany, GA	78	69	51	68	74	74	71	71	66	48	66	71	71	69	68
10540	Albany-Lebanon, OR	79	69	58	72	78	78	75	70	68	54	68	72	70	68	64
10580	Albany-Schenectady-Troy, NY	82	66	39	51	61	66	68	69	61	33	44	50	55	59	59
10740	Albuquerque, NM	90	78	58	69	80	77	76	76	73	52	62	72	69	68	68
10780	Alexandria, LA	80	70	57	72	77	75	73	75	67	54	70	73	72	70	71
10900	Allentown-Bethlehem-Easton, PA-NJ	82	66	43	56	68	73	75	74	61	38	50	58	63	66	65
11020	Altoona, PA	80	66	47	63	79	79	78	78	61	42	55	66	65	66	66
11100	Amarillo, TX	79	73	56	72	80	77	78	75	69	50	66	72	68	71	67
11180	Ames, IA	84	70	49	65	71	72	79	75	63	39	54	57	57	65	62
11260	Anchorage, AK	86	75	59	85	92	94	86	83	70	50	72	76	77	71	69
11460	Ann Arbor, MI	94	69	35	48	66	69	71	71	65	29	39	54	57	59	60
11500	Anniston-Oxford, AL	75	68	54	71	75	73	71	68	66	53	68	71	69	68	65
11540	Appleton, WI	87	62	43	61	76	76	76	72	59	37	52	63	62	63	60
11700	Asheville, NC	82	68	48	63	75	77	76	76	64	44	59	68	69	70	70
12020	Athens-Clarke County, GA	81	65	49	64	69	68	68	67	62	46	61	64	63	65	63
12060	Atlanta-Sandy Springs-Alpharetta, GA	84	71	52	67	73	73	73	72	68	49	64	68	69	69	69
12100	Atlantic City-Hammonton, NJ	77	63	30	40	53	72	77	74	59	26	36	45	64	70	67

17. This table tracks 384 metropolitan statistical areas and 47 non-metropolitan areas, and is available on BEA's website. Google's mobility report shows a few small regions have very high increases in retail and recreational time. This may be related to seasonal factors like summer tourists.

18. This column gives an estimate of average retail and recreational time from 2003 to 2018. This estimate is based on the American Time Use Survey (ATUS).

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
12220	Auburn-Opelika, AL	81	66	47	65	69	70	73	71	63	44	63	65	67	71	69
12260	Augusta-Richmond County, GA-SC	80	73	56	72	75	73	72	72	71	54	70	72	70	71	70
12420	Austin-Round Rock-Georgetown, TX	86	70	46	61	67	64	67	67	69	45	61	64	62	66	65
12540	Bakersfield, CA	76	67	47	55	63	61	61	62	64	43	53	59	58	59	58
12580	Baltimore-Columbia-Towson, MD	88	73	50	61	71	74	73	73	69	45	55	63	66	66	66
12620	Bangor, ME	81	68	47	62	73	77	79	78	64	42	54	61	64	67	66
12700	Barnstable Town, MA	86	70	47	69	100	133	138	115	66	44	63	90	124	130	106
12940	Baton Rouge, LA	80	69	51	65	73	71	70	70	67	49	64	70	69	69	68
12980	Battle Creek, MI	83	70	48	64	80	81	82	79	66	42	56	68	68	71	67
12999	Florida (nonmetropolitan portion)	78	72	52	66	71	69	66	66	70	51	65	70	68	66	66
13020	Bay City, MI	80	64	42	62	79	80	78	76	60	37	55	67	68	66	65
13140	Beaumont-Port Arthur, TX	80	71	54	71	74	69	66	75	70	53	70	71	67	65	73
13220	Beckley, WV	79	71	56	75	86	86	80	77	65	50	69	77	76	72	70
13380	Bellingham, WA	87	66	46	54	65	70	70	69	64	41	48	58	63	63	62
13460	Bend, OR	87	70	53	70	87	89	90	84	70	48	66	80	81	83	76
13740	Billings, MT	85	72	56	81	88	85	85	83	71	51	74	78	74	74	73
13780	Binghamton, NY	82	69	45	59	72	73	75	75	64	40	51	58	60	62	63
13820	Birmingham-Hoover, AL	84	72	54	69	74	72	72	71	69	52	67	70	69	70	68
13900	Bismarck, ND	83	68	51	78	87	86	82	78	62	42	66	71	69	66	62
13980	Blacksburg-Christiansburg, VA	83	70	51	63	69	71	71	69	65	46	58	61	63	64	62
13999	Georgia (nonmetropolitan portion)	74	69	53	70	74	73	70	70	66	50	69	71	71	69	68
14010	Bloomington, IL	84	66	45	58	70	75	81	76	61	37	48	56	62	68	64
14020	Bloomington, IN	84	68	46	60	72	72	73	73	64	39	52	61	61	63	62
14100	Bloomsburg-Berwick, PA	80	66	49	66	77	77	77	76	62	44	59	66	67	67	66
14260	Boise City, ID	83	73	53	71	79	75	77	77	68	47	65	70	66	68	68
14460	Boston-Cambridge-Newton, MA-NH	84	65	39	51	62	68	70	70	64	38	47	54	61	62	62
14500	Boulder, CO	93	69	43	59	69	72	75	71	67	38	52	58	61	65	61
14540	Bowling Green, KY	81	72	54	67	78	79	78	77	68	50	63	72	73	73	71
14740	Bremerton-Silverdale-Port Orchard, WA	79	66	51	61	72	74	73	69	65	46	57	65	66	66	63
14860	Bridgeport-Stamford-Norwalk, CT	83	64	42	57	71	74	75	74	60	37	51	62	65	67	65
15180	Brownsville-Harlingen, TX	80	68	37	62	65	57	60	58	67	37	63	64	57	61	58

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
15260	Brunswick, GA	82	78	53	75	82	82	77	76	75	51	74	79	79	76	75
15380	Buffalo-Cheektowaga, NY	81	65	38	49	62	71	73	72	61	33	42	51	58	62	60
15500	Burlington, NC	79	70	51	63	72	71	71	72	66	47	60	66	64	66	67
15540	Burlington-South Burlington, VT	86	68	42	59	72	75	75	77	64	36	51	59	62	62	64
15680	California-Lexington Park, MD	87	74	54	70	78	78	77	74	70	49	65	69	70	70	67
15940	Canton-Massillon, OH	80	66	51	67	77	76	75	75	61	46	59	66	64	65	65
15980	Cape Coral-Fort Myers, FL	79	64	38	53	57	55	55	55	62	37	54	56	54	56	55
15999	Hawaii (nonmetropolitan Portion)	85	65	35	42	49	50	48	44	65	35	43	48	50	49	44
16020	Cape Girardeau, MO-IL	81	71	52	76	82	76	77	76	66	46	70	73	67	70	67
16060	Carbondale-Marion, IL	80	68	52	63	71	72	75	74	62	45	56	60	63	67	65
16180	Carson City, NV	83	69	58	74	83	81	80	77	69	54	71	76	75	74	70
16220	Casper, WY	84	73	58	78	85	85	83	80	70	52	69	72	71	70	68
16300	Cedar Rapids, IA	81	66	48	64	75	73	75	80	60	38	53	60	58	60	66
16540	Chambersburg-Waynesboro, PA	82	70	51	64	73	76	76	77	66	47	58	65	68	69	69
16580	Champaign-Urbana, IL	83	67	47	56	66	71	77	76	62	38	46	52	57	64	63
16620	Charleston, WV	81	70	52	68	78	75	74	72	64	47	62	69	66	66	64
16700	Charleston-North Charleston, SC	84	73	52	70	76	73	71	72	71	50	68	72	70	69	69
16740	Charlotte-Concord-Gastonia, NC-SC	88	76	56	69	76	75	75	75	73	52	65	71	70	71	70
16820	Charlottesville, VA	85	68	45	58	67	69	69	70	64	41	54	60	63	64	64
16860	Chattanooga, TN-GA	81	70	55	73	78	77	76	75	67	53	70	73	72	72	71
16940	Cheyenne, WY	84	70	55	73	82	82	82	74	68	50	65	70	69	70	64
16980	Chicago-Naperville-Elgin, IL-IN-WI	87	69	47	58	71	76	77	74	65	40	50	59	64	65	63
16999	Idaho (nonmetropolitan portion)	75	68	51	70	80	82	78	77	64	45	64	71	73	70	67
17020	Chico, CA	89	75	53	63	69	69	70	71	73	49	60	65	65	67	66
17140	Cincinnati, OH-KY-IN	79	65	48	63	73	72	73	72	60	42	57	63	61	64	62
17300	Clarksville, TN-KY	78	72	56	74	77	74	73	72	68	52	70	71	68	68	66
17420	Cleveland, TN	82	73	60	80	82	79	78	78	70	57	77	77	75	74	73
17460	Cleveland-Elyria, OH	82	66	48	63	75	74	73	73	62	43	57	65	63	64	63
17660	Coeur d'Alene, ID	82	72	59	82	96	96	96	90	69	52	73	85	84	85	78
17780	College Station-Bryan, TX	83	70	50	63	67	64	71	70	68	49	62	64	63	70	68
17820	Colorado Springs, CO	88	74	56	74	82	83	83	82	71	50	67	71	72	73	72
17860	Columbia, MO	81	69	46	65	69	67	73	71	62	37	57	57	55	61	60

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
17900	Columbia, SC	83	73	55	69	74	72	73	72	70	51	67	70	69	70	69
17980	Columbus, GA-AL	80	73	53	72	76	74	72	70	70	51	70	72	71	70	67
17999	Illinois (nonmetropolitan portion)	83	73	58	71	82	84	82	82	68	50	60	69	70	70	70
18020	Columbus, IN	82	68	50	72	82	81	78	77	64	44	64	71	70	68	66
18140	Columbus, OH	85	69	50	66	77	76	76	76	65	44	59	66	65	66	66
18580	Corpus Christi, TX	82	76	56	77	79	69	74	73	76	56	77	79	69	74	72
18700	Corvallis, OR	84	63	39	50	62	62	63	62	62	35	46	55	55	56	56
18880	Crestview-Fort Walton Beach-Destin, FL	88	81	53	82	100	98	93	90	79	50	81	97	95	92	87
18999	Indiana (nonmetropolitan portion)	80	71	57	77	85	85	80	80	65	49	68	74	73	69	69
19060	Cumberland, MD-WV	79	69	50	65	75	76	77	75	63	44	57	62	62	65	63
19100	Dallas-Fort Worth-Arlington, TX	84	70	51	67	71	69	71	71	67	48	66	67	65	69	66
19140	Dalton, GA	81	75	61	77	79	77	75	76	72	58	75	75	73	71	72
19180	Danville, IL	79	69	62	70	76	77	79	80	64	53	60	62	64	66	67
19300	Daphne-Fairhope-Foley, AL	85	76	50	82	96	94	87	73	73	47	79	93	91	85	70
19340	Davenport-Moline-Rock Island, IA-IL	81	67	50	64	72	72	75	73	61	41	55	59	59	63	61
19430	Dayton-Kettering, OH	83	68	51	66	77	74	75	73	64	45	60	66	63	65	63
19460	Decatur, AL	78	71	56	73	77	75	75	74	68	54	70	73	70	71	69
19500	Decatur, IL	78	67	54	64	71	75	75	72	62	47	55	59	63	64	61
19660	Deltona-Daytona Beach-Ormond Beach, FL	83	76	48	68	74	71	70	68	74	46	68	72	70	70	68
19740	Denver-Aurora-Lakewood, CO	86	68	46	61	70	72	73	71	65	41	54	60	61	63	61
19780	Des Moines-West Des Moines, IA	82	67	49	64	75	75	80	76	60	39	53	61	61	66	63
19820	Detroit-Warren-Dearborn, MI	81	63	37	54	71	73	72	71	59	31	45	58	60	60	59
19999	Iowa (nonmetropolitan portion)	77	66	54	70	79	80	76	76	61	45	60	65	66	63	63
20020	Dothan, AL	79	71	54	72	77	75	71	71	68	52	70	74	72	69	69
20100	Dover, DE	77	67	51	62	74	75	77	78	63	47	57	65	67	70	70
20220	Dubuque, IA	81	65	46	62	73	73	72	69	60	38	52	59	59	58	57
20260	Duluth, MN-WI	83	68	48	66	84	88	85	83	63	41	54	69	72	70	70
20500	Durham-Chapel Hill, NC	83	70	50	58	64	64	64	64	67	46	55	58	59	60	59
20700	East Stroudsburg, PA	79	64	40	56	78	89	93	90	59	35	50	68	79	84	81
20740	Eau Claire, WI	81	66	45	65	80	78	77	74	61	38	55	66	63	64	62
20940	El Centro, CA	77	64	36	41	44	42	43	47	63	36	42	46	45	47	47
20999	Kansas (nonmetropolitan portion)	72	67	50	67	73	72	70	69	59	41	59	61	60	59	58

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
21060	Elizabethtown-Fort Knox, KY	82	71	55	69	79	78	77	76	66	50	64	71	70	70	68
21140	Elkhart-Goshen, IN	81	75	60	80	86	82	85	81	71	54	72	74	71	75	70
21300	Elmira, NY	81	70	40	49	64	72	75	74	65	35	41	52	60	63	63
21340	El Paso, TX	82	70	47	59	66	65	65	64	67	44	58	64	63	63	60
21420	Enid, OK	81	77	62	83	84	78	80	76	72	57	77	76	69	72	68
21500	Erie, PA	84	70	48	62	72	81	82	77	67	44	54	61	70	71	66
21660	Eugene-Springfield, OR	82	67	50	63	71	72	72	66	67	47	60	65	65	66	61
21780	Evansville, IN-KY	80	71	53	70	77	76	74	73	66	47	63	68	66	66	64
21820	Fairbanks, AK	88	78	61	87	94	94	94	91	70	48	67	71	71	73	73
21999	Kentucky (nonmetropolitan portion)	75	69	54	69	77	76	73	72	64	47	63	68	67	66	63
22020	Fargo, ND-MN	83	67	46	67	76	76	79	76	63	37	54	59	59	63	60
22140	Farmington, NM	80	74	56	64	75	74	73	73	68	48	56	65	63	62	62
22180	Fayetteville, NC	86	81	63	75	81	80	79	78	78	60	72	77	76	76	74
22220	Fayetteville-Springdale-Rogers, AR	80	70	55	69	72	71	74	72	64	48	62	62	61	65	63
22380	Flagstaff, AZ	84	72	44	69	86	86	88	90	71	39	62	76	75	77	80
22420	Flint, MI	80	64	42	63	77	77	76	75	60	36	55	64	65	65	65
22500	Florence, SC	80	75	57	74	78	75	73	73	72	55	71	75	71	71	70
22520	Florence-Muscle Shoals, AL	78	69	56	73	77	75	75	75	66	53	70	73	70	71	70
22540	Fond du Lac, WI	82	65	49	68	82	82	81	77	63	43	60	69	69	68	66
22660	Fort Collins, CO	89	71	48	67	80	84	82	79	68	42	61	69	73	72	69
22900	Fort Smith, AR-OK	78	74	62	78	80	78	76	76	67	55	71	71	70	68	68
22999	Louisiana (nonmetropolitan portion)	74	69	53	68	73	71	67	68	67	51	67	71	69	66	67
23060	Fort Wayne, IN	81	67	49	67	77	77	76	74	63	43	59	65	65	65	64
23420	Fresno, CA	82	72	49	53	63	62	64	65	68	45	49	59	58	60	60
23460	Gadsden, AL	78	69	52	72	77	71	71	69	67	50	70	73	67	68	66
23540	Gainesville, FL	83	69	47	60	66	65	64	64	66	45	59	64	63	64	64
23580	Gainesville, GA	84	73	57	74	79	78	78	78	70	54	72	74	73	74	74
23900	Gettysburg, PA	82	65	41	58	78	79	78	76	60	37	53	69	70	70	67
23999	Maine (nonmetropolitan portion)	75	65	49	66	78	85	80	78	62	44	57	67	73	69	67
24020	Glens Falls, NY	82	69	51	69	82	95	90	86	64	46	60	70	82	78	74
24140	Goldsboro, NC	78	72	57	69	72	71	71	69	68	53	66	67	66	67	64
24220	Grand Forks, ND-MN	82	68	47	65	75	75	74	73	64	39	52	58	57	58	58

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
24260	Grand Island, NE	81	71	50	64	78	81	83	82	65	42	54	66	68	70	70
24300	Grand Junction, CO	82	73	58	79	85	85	84	87	65	49	69	73	72	73	74
24340	Grand Rapids-Kentwood, MI	83	64	41	58	75	78	78	76	61	36	49	64	66	66	65
24420	Grants Pass, OR	80	70	60	75	87	86	84	80	66	53	69	78	77	75	71
24500	Great Falls, MT	83	69	56	80	88	85	83	81	69	52	73	78	74	72	71
24540	Greeley, CO	79	66	52	69	71	71	72	71	63	47	62	59	60	62	62
24580	Green Bay, WI	83	65	46	62	75	76	77	73	61	39	54	62	63	64	61
24660	Greensboro-High Point, NC	78	69	51	62	68	67	68	68	65	47	59	61	60	63	63
24780	Greenville, NC	78	66	51	64	68	68	68	67	62	46	62	62	62	64	62
24860	Greenville-Anderson, SC	85	74	57	74	78	75	76	75	70	53	70	72	69	71	70
24999	Maryland (nonmetropolitan portion)	85	75	57	75	88	92	80	82	70	52	67	75	79	68	70
25060	Gulfport-Biloxi, MS	80	76	56	77	84	82	76	74	73	53	75	81	79	74	72
25180	Hagerstown-Martinsburg, MD-WV	79	70	51	65	73	72	71	72	66	47	60	64	63	63	63
25220	Hammond, LA	82	76	62	79	83	80	80	80	74	60	79	81	79	79	78
25260	Hanford-Corcoran, CA	78	69	52	61	67	65	67	68	63	45	55	59	57	59	60
25420	Harrisburg-Carlisle, PA	82	66	42	55	69	74	76	72	61	37	50	59	65	67	63
25500	Harrisonburg, VA	83	76	59	72	80	83	82	86	71	53	66	71	73	74	78
25540	Hartford-East Hartford-Middletown, CT	85	68	46	60	72	74	76	75	64	41	53	61	63	66	65
25620	Hattiesburg, MS	81	75	52	71	78	77	73	74	72	49	68	74	74	70	71
25860	Hickory-Lenoir-Morganton, NC	79	72	57	71	76	74	73	72	69	54	68	71	68	68	68
25940	Hilton Head Island-Bluffton, SC	85	79	53	78	92	88	84	84	77	50	77	89	85	82	82
25980	Hinesville, GA	84	77	59	78	80	78	77	74	74	57	76	77	76	76	72
25999	Massachusetts (nonmetropolitan portion)	90	66	46	65	79	91	77	80	62	41	57	68	80	68	71
26140	Homosassa Springs, FL	83	73	50	69	73	70	69	70	71	49	69	71	69	68	69
26300	Hot Springs, AR	82	75	60	78	87	87	83	80	71	55	73	81	81	77	74
26380	Houma-Thibodaux, LA	80	71	55	71	73	71	71	71	69	53	70	72	70	71	70
26420	Houston-The Woodlands-Sugar Land, TX	84	71	52	69	71	67	70	71	69	50	69	69	66	70	69
26580	Huntington-Ashland, WV-KY-OH	79	71	55	72	80	78	73	73	66	50	67	72	69	66	65
26620	Huntsville, AL	78	66	49	64	70	67	68	68	63	47	61	65	62	64	63
26820	Idaho Falls, ID	80	73	57	78	88	87	86	86	68	47	66	74	71	70	70
26900	Indianapolis-Carmel-Anderson, IN	78	64	47	63	73	74	73	73	60	41	56	62	62	62	62
26980	Iowa City, IA	86	69	45	61	74	73	84	78	62	35	51	59	58	70	64

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
26999	Michigan (nonmetropolitan portion)	79	65	47	68	86	90	83	81	61	42	60	74	78	71	70
27060	Ithaca, NY	87	69	33	44	55	62	71	71	64	28	36	41	49	59	59
27100	Jackson, MI	79	65	44	62	76	77	76	76	60	38	54	63	64	64	64
27140	Jackson, MS	81	76	56	73	79	76	73	72	73	53	70	75	72	71	69
27180	Jackson, TN	80	74	58	78	83	79	78	75	70	53	72	75	71	71	68
27260	Jacksonville, FL	81	71	51	68	71	69	70	69	68	48	67	69	67	69	67
27340	Jacksonville, NC	83	76	60	74	82	81	80	77	73	57	72	77	77	78	74
27500	Janesville-Beloit, WI	85	71	53	69	85	83	83	78	66	45	59	72	69	69	67
27620	Jefferson City, MO	80	72	56	77	84	82	81	79	65	47	68	72	70	69	68
27740	Johnson City, TN	86	78	60	85	90	86	84	84	73	55	79	83	79	78	77
27780	Johnstown, PA	82	70	48	65	81	81	78	76	65	43	56	68	68	66	64
27860	Jonesboro, AR	81	73	59	73	76	75	75	75	67	51	66	66	64	65	65
27900	Joplin, MO	79	75	60	83	84	79	82	81	69	53	77	74	70	73	72
27980	Kahului-Wailuku-Lahaina, HI	87	66	32	39	44	46	43	43	65	32	40	44	46	45	42
27999	Minnesota (nonmetropolitan portion)	79	67	53	69	83	85	80	79	62	45	58	69	70	67	66
28020	Kalamazoo-Portage, MI	84	65	40	55	70	73	73	72	61	34	47	58	61	61	61
28100	Kankakee, IL	78	68	49	61	72	74	78	76	64	43	53	61	63	67	65
28140	Kansas City, MO-KS	81	69	49	66	74	72	73	72	61	40	57	61	60	62	61
28420	Kennewick-Richland, WA	83	71	56	65	67	70	72	71	68	49	59	59	62	65	63
28660	Killeen-Temple, TX	81	74	58	74	76	73	75	73	71	56	72	72	70	73	69
28700	Kingsport-Bristol, TN-VA	79	71	56	77	81	79	77	78	67	52	72	74	72	71	71
28740	Kingston, NY	82	68	43	57	66	76	78	79	63	38	49	54	65	68	68
28940	Knoxville, TN	81	71	55	74	78	76	75	74	67	51	70	72	70	70	70
28999	Mississippi (nonmetropolitan portion)	64	60	45	60	63	62	59	58	57	42	58	59	59	56	55
29020	Kokomo, IN	80	65	52	72	80	79	79	79	59	45	62	68	68	68	68
29100	La Crosse-Onalaska, WI-MN	86	66	47	66	76	75	76	72	61	40	56	63	61	63	61
29180	Lafayette, LA	80	72	57	73	76	72	69	73	70	54	71	74	70	67	71
29200	Lafayette-West Lafayette, IN	82	67	48	64	71	71	74	72	62	40	55	60	59	63	61
29340	Lake Charles, LA	79	69	52	67	73	69	59	49	67	51	68	71	68	59	48
29420	Lake Havasu City-Kingman, AZ	83	76	59	76	82	74	73	77	75	57	76	83	77	78	79
29460	Lakeland-Winter Haven, FL	83	73	53	67	69	67	68	67	71	51	67	67	66	67	66
29540	Lancaster, PA	81	64	42	54	65	72	75	73	59	38	49	56	63	66	64

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
29620	Lansing-East Lansing, MI	82	63	39	56	70	70	71	70	59	32	47	57	57	58	58
29700	Laredo, TX	78	65	41	54	59	55	56	57	64	40	55	58	56	57	56
29740	Las Cruces, NM	82	72	53	62	69	67	67	67	69	49	58	65	62	63	61
29820	Las Vegas-Henderson-Paradise, NV	89	73	49	59	72	72	70	71	72	48	59	73	74	72	71
29940	Lawrence, KS	82	66	46	60	69	66	70	68	59	37	51	57	55	59	58
29999	Missouri (nonmetropolitan portion)	79	76	58	80	87	88	82	81	71	51	73	78	79	75	73
30020	Lawton, OK	78	71	55	74	77	75	73	71	66	50	69	70	68	67	64
30140	Lebanon, PA	82	69	49	63	71	75	75	71	64	45	57	62	66	66	62
30300	Lewiston, ID-WA	80	74	60	73	81	78	78	75	70	53	66	73	69	70	66
30340	Lewiston-Auburn, ME	82	70	50	66	74	77	78	77	66	45	58	62	66	67	67
30460	Lexington-Fayette, KY	80	67	49	62	71	70	69	68	64	46	58	63	62	63	62
30620	Lima, OH	79	66	53	68	78	73	75	76	62	47	61	68	63	65	66
30700	Lincoln, NE	84	72	55	68	76	75	79	77	65	46	58	62	61	65	64
30780	Little Rock-North Little Rock-Conway, AR	81	72	59	73	76	75	75	73	68	53	69	68	68	69	66
30860	Logan, UT-ID	81	72	59	69	74	76	78	78	67	52	61	64	65	69	68
30980	Longview, TX	81	75	60	77	81	76	76	76	72	57	75	76	72	73	71
30999	Montana (nonmetropolitan portion)	83	70	52	75	89	93	89	86	69	48	68	79	82	78	76
31020	Longview, WA	81	71	60	72	78	78	79	75	69	55	67	71	71	72	68
31080	Los Angeles-Long Beach-Anaheim, CA	87	68	41	48	57	59	60	61	68	39	49	55	57	60	59
31140	Louisville/Jefferson County, KY-IN	78	66	49	62	71	70	68	67	61	44	57	62	62	61	59
31180	Lubbock, TX	84	76	58	77	80	77	81	79	73	54	73	74	71	75	73
31340	Lynchburg, VA	80	73	56	68	74	76	75	74	68	52	64	67	69	70	67
31420	Macon-Bibb County, GA	78	70	52	67	71	70	68	67	66	49	64	67	65	64	64
31460	Madera, CA	79	71	49	50	58	62	63	63	66	44	47	54	58	60	58
31540	Madison, WI	85	62	39	53	67	68	68	65	57	30	44	53	54	55	54
31700	Manchester-Nashua, NH	85	68	46	62	75	76	77	77	64	41	54	64	65	66	66
31740	Manhattan, KS	84	70	50	69	75	72	75	70	64	42	61	63	61	64	59
31860	Mankato, MN	84	65	47	60	73	71	73	74	60	38	49	59	57	60	61
31900	Mansfield, OH	79	65	51	69	81	77	77	75	60	45	62	70	67	68	66
31999	Nebraska (nonmetropolitan portion)	79	70	56	72	81	82	78	78	65	47	61	68	69	66	65
32580	McAllen-Edinburg-Mission, TX	76	65	40	59	60	53	57	58	65	40	60	60	54	58	57
32780	Medford, OR	81	69	53	65	76	75	76	74	65	46	59	67	66	67	65

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
32820	Memphis, TN-MS-AR	81	72	56	70	75	73	72	70	68	51	65	68	67	66	64
32900	Merced, CA	79	71	52	62	68	66	66	67	67	47	59	64	62	63	62
32999	Nevada (nonmetropolitan portion)	81	72	57	74	84	82	79	78	71	53	71	78	75	73	71
33100	Miami-Fort Lauderdale-Pompano Beach, FL	87	69	43	54	62	61	61	62	68	43	57	63	61	63	64
33140	Michigan City-La Porte, IN	79	69	51	80	95	94	88	85	64	46	72	84	82	78	74
33220	Midland, MI	82	62	40	57	73	72	74	75	58	35	50	61	59	62	64
33260	Midland, TX	87	75	52	67	70	65	67	68	72	48	65	66	62	64	63
33340	Milwaukee-Waukesha, WI	84	67	46	61	72	72	72	70	63	40	54	60	60	62	59
33460	Minneapolis-St. Paul-Bloomington, MN-WI	89	71	50	62	75	77	78	78	66	41	51	60	63	65	65
33540	Missoula, MT	82	67	46	64	75	75	80	81	62	38	55	63	61	67	68
33660	Mobile, AL	76	70	54	69	72	69	68	66	67	51	66	69	66	66	64
33700	Modesto, CA	85	73	50	60	70	68	68	70	69	46	56	66	63	64	65
33740	Monroe, LA	86	78	59	74	84	83	81	81	75	56	70	80	79	78	77
33780	Monroe, MI	84	68	44	62	83	84	85	85	64	39	53	70	72	73	73
33860	Montgomery, AL	80	72	54	69	72	72	72	70	69	52	67	69	69	70	68
33999	New Hampshire (nonmetropolitan portion)	81	69	51	70	83	91	84	81	64	46	62	72	80	73	70
34060	Morgantown, WV	83	69	47	65	75	72	73	73	64	42	59	65	62	64	63
34100	Morristown, TN	81	74	61	83	85	83	81	80	70	58	79	79	77	76	76
34580	Mount Vernon-Anacortes, WA	82	67	52	63	75	79	79	73	66	46	57	67	71	72	66
34620	Muncie, IN	80	66	51	68	73	72	74	73	62	44	60	61	60	63	63
34740	Muskegon, MI	80	68	48	65	82	87	85	81	65	43	57	71	74	74	70
34820	Myrtle Beach-Conway ..., SC-NC	81	75	49	82	102	98	94	95	73	46	82	99	96	93	93
34900	Napa, CA	86	70	42	50	64	65	63	62	68	38	48	58	59	58	56
34940	Naples-Marco Island, FL	91	73	42	56	60	58	58	59	72	41	56	59	57	58	59
34980	Nashville-Davidson—Murfreesboro..., TN	80	69	49	66	72	69	70	70	64	44	63	65	63	65	64
35100	New Bern, NC	81	73	55	69	75	75	72	72	70	52	67	71	71	69	69
35300	New Haven-Milford, CT	89	73	52	67	79	81	84	82	69	47	60	70	72	75	73
35380	New Orleans-Metairie, LA	81	65	43	56	62	63	62	62	63	40	56	60	62	61	61
35620	New York-Newark-Jersey City, NY-NJ-PA	85	64	30	43	54	63	66	68	59	25	37	44	54	57	58
35660	Niles, MI	76	66	46	64	83	87	90	84	62	41	56	71	75	80	73
35840	North Port-Sarasota-Bradenton, FL	89	74	44	62	68	65	64	64	72	43	62	67	64	65	64
35980	Norwich-New London, CT	84	67	45	57	72	77	79	76	63	41	52	63	69	71	69

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
35999	New Mexico (nonmetropolitan portion)	83	75	56	67	76	73	71	71	69	48	58	66	62	61	60
36100	Ocala, FL	81	72	52	67	72	69	68	69	69	50	66	70	67	68	68
36140	Ocean City, NJ	82	73	40	84	169	232	172	147	69	36	79	161	224	165	140
36220	Odessa, TX	83	74	52	68	68	63	65	64	71	48	66	64	60	62	59
36260	Ogden-Clearfield, UT	83	73	59	77	80	79	81	80	68	52	69	71	69	71	70
36420	Oklahoma City, OK	81	71	55	73	78	75	74	72	66	49	68	70	67	67	64
36500	Olympia-Lacey-Tumwater, WA	87	71	54	64	78	80	81	78	69	50	59	71	72	74	71
36540	Omaha-Council Bluffs, NE-IA	81	68	52	66	73	74	75	74	60	42	55	59	60	61	61
36740	Orlando-Kissimmee-Sanford, FL	87	68	40	55	61	62	63	64	66	39	55	59	60	63	63
36780	Oshkosh-Neenah, WI	79	63	44	60	74	74	75	72	60	39	51	61	60	62	60
36980	Owensboro, KY	80	68	51	65	73	72	72	70	63	45	58	64	63	64	61
36999	New York (nonmetropolitan portion)	76	66	46	60	71	77	74	72	61	41	52	60	65	62	61
37100	Oxnard-Thousand Oaks-Ventura, CA	87	70	42	51	61	62	65	66	69	41	52	60	62	65	65
37340	Palm Bay-Melbourne-Titusville, FL	90	78	53	71	75	72	71	72	76	52	72	75	72	72	72
37460	Panama City, FL	80	74	49	80	96	91	84	81	72	47	79	93	89	83	79
37620	Parkersburg-Vienna, WV	79	68	51	70	80	74	76	76	63	48	64	71	65	68	67
37860	Pensacola-Ferry Pass-Brent, FL	83	77	58	77	83	78	77	72	75	55	75	80	76	76	70
37900	Peoria, IL	78	64	49	61	71	73	73	73	58	40	51	57	60	60	60
37980	Philadelphia-Camden-..., PA-NJ-DE-MD	80	63	40	50	59	64	65	66	59	35	45	50	55	57	58
37999	North Carolina (nonmetropolitan portion)	72	67	53	67	75	75	69	69	63	50	63	70	70	65	64
38060	Phoenix-Mesa-Chandler, AZ	84	73	52	63	65	61	63	65	72	52	66	68	65	68	67
38220	Pine Bluff, AR	78	71	63	75	77	75	74	70	66	58	70	70	68	68	63
38300	Pittsburgh, PA	84	67	45	58	73	71	73	73	62	39	51	62	59	63	62
38340	Pittsfield, MA	82	69	49	62	74	80	80	77	64	43	55	62	69	71	68
38540	Pocatello, ID	79	71	54	73	82	83	81	78	66	47	63	71	70	69	65
38860	Portland-South Portland, ME	84	69	44	62	79	93	96	89	66	41	55	68	83	86	79
38900	Portland-Vancouver-Hillsboro, OR-WA	82	64	46	55	62	66	67	63	62	40	52	55	58	60	56
38940	Port St. Lucie, FL	84	73	49	65	68	66	66	68	72	49	66	69	67	68	69
38999	North Dakota (nonmetropolitan portion)	82	71	54	75	85	85	84	80	67	45	63	68	67	67	65
39100	Poughkeepsie-Newburgh-Middletown, NY	81	65	37	47	58	66	72	72	60	32	39	46	55	61	61
39150	Prescott Valley-Prescott, AZ	81	70	52	72	79	74	75	76	69	47	67	72	67	68	69
39300	Providence-Warwick, RI-MA	83	69	48	64	77	81	77	77	65	44	57	68	71	68	67

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
39340	Provo-Orem, UT	81	69	55	70	75	75	77	74	64	48	60	65	63	66	63
39380	Pueblo, CO	81	71	56	73	79	79	77	76	67	51	66	69	69	67	67
39460	Punta Gorda, FL	89	74	45	62	66	62	63	64	72	44	62	65	61	63	64
39540	Racine, WI	80	67	50	64	76	75	76	74	63	44	58	63	63	65	63
39580	Raleigh-Cary, NC	85	70	50	60	67	68	68	69	67	46	57	62	62	65	64
39660	Rapid City, SD	82	73	55	79	94	101	99	92	69	50	71	82	88	87	81
39740	Reading, PA	75	62	43	56	64	69	71	69	57	38	50	55	59	62	61
39820	Redding, CA	84	74	54	62	74	72	71	73	72	50	59	70	68	67	68
39900	Reno, NV	87	71	55	67	79	78	79	80	71	51	64	72	71	73	73
39999	Ohio (nonmetropolitan portion)	74	65	53	70	78	77	74	74	61	47	63	68	66	64	64
40060	Richmond, VA	84	73	52	63	71	73	72	72	68	47	59	63	66	66	65
40140	Riverside-San Bernardino-Ontario, CA	84	70	45	52	64	64	65	66	69	43	51	61	62	64	63
40220	Roanoke, VA	81	70	54	66	74	74	71	70	65	50	62	66	66	65	63
40340	Rochester, MN	84	66	47	62	74	75	75	73	61	38	51	59	60	61	60
40380	Rochester, NY	84	69	43	55	66	73	76	75	64	38	48	54	60	64	63
40420	Rockford, IL	80	71	53	64	75	79	80	77	66	45	54	61	65	67	64
40580	Rocky Mount, NC	78	74	59	72	75	74	72	71	70	56	69	69	69	68	66
40660	Rome, GA	80	68	58	76	78	76	74	72	66	56	73	74	71	70	67
40900	Sacramento-Roseville-Folsom, CA	83	67	44	50	60	61	61	62	64	39	46	54	56	56	57
40980	Saginaw, MI	85	67	41	58	82	85	85	84	63	36	50	71	73	73	72
40999	Oklahoma (nonmetropolitan portion)	80	77	61	79	86	82	77	77	72	57	73	78	74	69	69
41060	St. Cloud, MN	82	67	50	60	77	78	80	81	62	41	48	61	62	66	68
41100	St. George, UT	80	73	56	77	80	77	80	81	69	51	73	75	74	77	75
41140	St. Joseph, MO-KS	80	74	57	75	82	81	81	77	66	48	66	69	68	69	66
41180	St. Louis, MO-IL	87	74	52	68	77	78	77	76	67	44	60	66	67	67	65
41420	Salem, OR	82	69	54	65	74	75	75	70	68	50	61	67	68	68	64
41500	Salinas, CA	84	69	44	49	61	64	65	65	68	43	49	59	63	64	74
41540	Salisbury, MD-DE	81	72	50	68	103	111	102	96	67	46	64	95	103	96	89
41620	Salt Lake City, UT	82	67	50	64	67	66	68	68	61	42	56	57	56	59	57
41660	San Angelo, TX	82	72	50	70	73	66	70	70	69	47	67	70	63	68	66
41700	San Antonio-New Braunfels, TX	84	71	52	67	70	65	68	69	70	50	67	67	64	68	67
41740	San Diego-Chula Vista-Carlsbad, CA	89	70	41	48	58	61	63	65	69	40	49	57	60	64	64

Geofips code	Region Name[17]	ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
41860	San Francisco-Oakland-Berkeley, CA	93	66	36	42	49	55	56	57	65	34	43	47	54	56	56
41940	San Jose-Sunnyvale-Santa Clara, CA	96	67	36	41	51	55	56	59	66	33	40	47	52	54	55
41999	Oregon (nonmetropolitan portion)	73	66	52	68	81	85	79	73	62	45	63	72	76	70	64
42020	San Luis Obispo-Paso Robles, CA	89	68	41	52	66	68	72	75	68	39	53	64	66	71	74
42100	Santa Cruz-Watsonville, CA	88	67	40	46	62	66	62	65	66	38	45	58	62	60	62
42140	Santa Fe, NM	89	72	49	61	74	72	72	75	66	41	52	63	61	61	65
42200	Santa Maria-Santa Barbara, CA	93	73	46	55	64	66	69	71	73	45	56	63	65	68	70
42220	Santa Rosa-Petaluma, CA	90	70	42	49	62	66	67	67	68	38	46	56	60	63	62
42340	Savannah, GA	82	73	52	70	77	76	74	73	71	49	69	74	74	72	71
42540	Scranton--Wilkes-Barre, PA	80	65	44	59	71	77	78	76	60	39	51	61	66	67	66
42660	Seattle-Tacoma-Bellevue, WA	87	65	46	54	63	68	70	68	63	41	51	56	61	63	61
42680	Sebastian-Vero Beach, FL	84	71	46	61	65	62	61	62	69	45	62	64	62	62	62
42700	Sebring-Avon Park, FL	82	70	47	59	59	56	57	58	68	46	59	58	55	57	58
42999	Pennsylvania (nonmetropolitan portion)	75	66	49	67	79	80	74	74	62	44	60	69	69	64	64
43100	Sheboygan, WI	81	66	50	67	81	80	78	77	64	45	59	68	66	65	66
43300	Sherman-Denison, TX	79	72	60	76	80	76	77	77	68	56	74	76	72	75	73
43340	Shreveport-Bossier City, LA	80	71	52	69	78	76	74	73	68	49	66	74	72	71	69
43420	Sierra Vista-Douglas, AZ	76	68	49	61	63	61	62	61	66	47	60	60	58	59	57
43580	Sioux City, IA-NE-SD	81	71	55	67	77	78	79	79	65	45	56	63	62	65	64
43620	Sioux Falls, SD	83	72	51	69	82	83	84	81	66	42	58	67	67	70	67
43780	South Bend-Mishawaka, IN-MI	80	68	51	69	80	79	78	76	64	45	62	68	67	68	65
43900	Spartanburg, SC	80	73	58	74	77	74	74	73	69	53	70	71	67	69	69
44060	Spokane-Spokane Valley, WA	87	75	58	70	83	82	79	78	71	51	61	72	70	68	66
44100	Springfield, IL	81	66	49	59	71	74	76	74	61	41	51	59	62	65	63
44140	Springfield, MA	78	64	43	56	63	66	67	67	60	38	49	51	55	56	57
44180	Springfield, MO	80	72	55	78	83	82	81	80	65	47	70	72	70	70	69
44220	Springfield, OH	80	72	61	76	84	82	80	79	68	55	69	74	71	71	69
44300	State College, PA	85	58	33	46	60	62	65	62	53	27	39	48	50	54	51
44420	Staunton, VA	82	73	54	67	77	79	78	77	67	48	61	67	69	70	69
44700	Stockton, CA	83	72	50	57	65	65	67	69	69	46	53	60	60	63	64
44940	Sumter, SC	79	75	58	73	76	72	71	71	73	56	71	72	68	69	68
44999	Rhode Island (nonmetropolitan portion)	102	101	100	104	100	101	101	101	100	99	106	99	100	101	101

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
45060	Syracuse, NY	84	70	45	57	70	74	75	76	66	40	49	58	62	64	64
45220	Tallahassee, FL	82	72	50	63	67	65	65	64	69	47	61	63	62	64	62
45300	Tampa-St. Petersburg-Clearwater, FL	85	72	48	64	68	66	67	67	69	46	65	66	65	67	66
45460	Terre Haute, IN	80	71	54	74	82	81	80	79	67	48	67	72	71	72	69
45500	Texarkana, TX-AR	79	74	58	77	81	77	74	72	71	54	73	75	72	70	67
45540	The Villages, FL	85	70	40	55	59	55	55	58	67	38	55	57	54	55	57
45780	Toledo, OH	82	68	49	69	84	81	79	78	64	43	62	72	69	69	67
45820	Topeka, KS	82	74	56	74	81	79	80	77	67	48	65	70	68	69	67
45940	Trenton-Princeton, NJ	85	66	31	43	51	59	63	65	62	26	37	41	49	55	56
45999	South Carolina (nonmetropolitan portion)	72	67	53	68	73	70	66	66	64	51	66	70	67	64	63
46060	Tucson, AZ	84	71	50	61	63	61	62	63	69	48	62	63	61	63	62
46140	Tulsa, OK	81	74	59	77	81	78	77	77	69	53	71	73	70	69	69
46220	Tuscaloosa, AL	78	68	52	67	70	69	70	67	66	49	65	66	65	67	64
46300	Twin Falls, ID	80	75	56	76	85	84	84	83	71	49	67	75	72	73	71
46340	Tyler, TX	81	70	55	75	79	74	77	76	67	51	72	74	70	73	72
46520	Urban Honolulu, HI	91	72	46	55	63	64	59	52	72	46	56	62	64	60	52
46540	Utica-Rome, NY	80	69	45	58	70	74	74	72	64	40	50	58	61	62	60
46660	Valdosta, GA	81	74	56	75	79	78	75	73	71	53	73	76	75	73	71
46700	Vallejo, CA	86	71	48	53	64	67	66	67	70	46	53	61	65	65	64
46999	South Dakota (nonmetropolitan portion)	83	73	56	75	87	90	85	81	70	51	66	75	77	73	70
47020	Victoria, TX	82	73	52	71	74	68	69	69	72	52	71	73	68	69	68
47220	Vineland-Bridgeton, NJ	85	78	55	66	73	76	76	78	74	52	60	65	68	70	72
47260	Virginia Beach-Norfolk-Newport ..., VA-NC	82	72	53	64	74	76	75	74	69	50	62	69	72	71	69
47300	Visalia, CA	78	68	49	54	60	58	59	60	62	42	48	53	50	52	51
47380	Waco, TX	84	74	54	73	76	72	76	76	71	50	71	71	68	73	72
47460	Walla Walla, WA	81	70	56	66	79	76	77	75	67	50	60	70	68	70	66
47580	Warner Robins, GA	79	71	52	70	74	75	72	73	68	49	68	71	72	70	70
47900	Washington-Arlington-..., DC-VA-MD-WV	85	69	44	53	62	66	67	67	65	40	49	55	59	61	60
47940	Waterloo-Cedar Falls, IA	83	71	51	66	77	76	81	76	65	42	55	63	61	67	63
47999	Tennessee (nonmetropolitan portion)	74	71	55	75	83	81	76	75	69	53	72	78	76	72	71
48060	Watertown-Fort Drum, NY	83	71	49	65	78	88	87	85	67	44	57	65	75	76	73
48140	Wausau-Weston, WI	83	67	48	67	80	78	76	75	64	41	57	67	64	63	63

Geofips code and Region Name[17]		ATUS norm[18]	Unadjusted time usage 2020							Adjusted time usage 2020						
			Mar	Apr	May	Jun	Jul	Aug	Sep	Mar	Apr	May	Jun	Jul	Aug	Sep
48260	Weirton-Steubenville, WV-OH	79	71	56	71	81	78	76	78	66	50	64	70	67	66	67
48300	Wenatchee, WA	82	68	53	65	79	88	82	77	61	42	54	67	75	70	64
48540	Wheeling, WV-OH	78	65	49	67	77	74	73	73	60	44	60	66	62	62	63
48620	Wichita, KS	78	70	52	69	77	73	73	73	63	45	62	67	62	63	63
48660	Wichita Falls, TX	78	71	54	72	76	71	73	73	66	49	67	69	65	67	66
48700	Williamsport, PA	79	64	45	62	76	76	77	74	59	40	55	65	65	67	64
48900	Wilmington, NC	82	71	49	68	80	82	78	77	69	47	66	77	78	75	73
48999	Texas (nonmetropolitan portion)	78	73	55	73	76	73	72	71	73	55	73	76	73	71	70
49020	Winchester, VA-WV	84	76	56	71	80	82	81	80	71	51	66	71	73	74	73
49180	Winston-Salem, NC	87	78	61	72	79	78	76	77	74	57	68	73	71	71	72
49340	Worcester, MA-CT	83	70	48	62	70	75	76	76	65	44	54	59	63	64	64
49420	Yakima, WA	82	72	59	67	68	69	71	72	68	52	58	59	59	62	61
49620	York-Hanover, PA	81	67	48	62	73	74	74	74	63	43	57	63	65	66	65
49660	Youngstown-Warren-Boardman, OH-PA	78	65	50	67	79	77	75	75	61	44	59	68	65	65	65
49700	Yuba City, CA	83	73	59	80	80	74	74	74	70	55	76	75	68	69	68
49740	Yuma, AZ	81	70	44	53	54	52	53	55	69	44	55	55	55	57	56
49999	Utah (nonmetropolitan portion)	78	70	52	71	81	83	79	77	65	45	63	71	73	69	67
50999	Vermont (nonmetropolitan portion)	83	66	45	63	75	81	78	77	62	39	55	62	68	65	65
51999	Virginia (nonmetropolitan portion)	76	71	55	70	77	78	74	73	66	49	65	67	68	66	65
53999	Washington (nonmetropolitan portion)	77	67	53	69	79	85	80	75	64	47	63	71	76	73	66
54999	West Virginia (nonmetropolitan portion)	74	67	51	69	78	76	74	72	62	49	62	69	67	65	64
55999	Wisconsin (nonmetropolitan portion)	83	70	53	76	91	93	86	82	67	48	68	77	80	73	71
56999	Wyoming (nonmetropolitan portion)	88	76	60	81	96	103	92	89	73	54	71	84	89	78	77