Title
Daily Monitoring of Economic Activity in North America by Electricity Consumption

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Abstract
Amid the COVID-19 outbreak, governments across the globe mandated lockdowns that brought economic activity to an abrupt halt. In normal times, to gauge about the level of economic activity, policymakers consider an extensive set of macroeconomic data, such as employment, industrial production, and GDP. These data are at different frequencies and at times released with a significant lag. The most timely and informative of all releases, at least in the context of the US are the employment numbers as they are released at a monthly frequency and on the first Friday of the month.

However, in the current situation, where the economic impact of COVID-19 is not known and both, the progress of the pandemic as well as the impact of the economic stimulus packages intended to counteract the adverse economic effects are unknown, there is a need for alternative indicators that could provide a timely reading of the state of the economy at high frequencies. Data on electricity consumption is available at very high frequencies and is released daily. As electricity is an input for many industries, it could be useful to track economic activity and to provide information about the severity of the contraction and (hopefully) the recovery in real time.

We gather daily data on electricity consumption from regional Independent System Operators’ (ISO) websites in the United States and Canada. Since electricity consumption highly depends on weather conditions, we control for heating and cooling degree days. To do so, we collect temperature data for the states or provinces served by the ISOs. We also control for general trends in the electricity market (heavier reliance on green technologies) as well as weekends and holidays.

Our empirical strategy consists of the following: We start by presenting and analyzing the daily data and document how government implemented measures related to COVID-19 affect electricity consumption. For example, California and Ontario have seen declines in electricity consumption since the respective social distancing measures have come into effect. Then, we aggregate the data on electricity consumption to a monthly frequency to study the relation with standard business cycle indicators such as employment growth and the unemployment rate, for example. First findings suggest that monthly electricity consumption and employment growth are positively correlated, especially in times of economic downturns. Finally, we introduce electricity consumption at the ISO level and use mixed-frequency regressions to monitor economic activity daily. Some comparisons with alternatives such as using initial unemployment insurance claims for monitoring regional economic activity are discussed.

Key Words
COVID-19; Electricity consumption; System Operators; Economic activity; Mixed frequency

JEL Codes
C32; E32; I18; L94; Q43
Data Description

1) Daily data on electricity demand from Independent System Operators across the United States and Canada

2) Daily data on temperature at the station or state level, in particular, cooling and heating degree days. Source US: NOAA, Source Canada: Canadian Center for Climate Services