Tracking the COVID-19 Crisis with High Resolution Transaction Data

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Introduction

- Accurate, real-time information on the state of the economy can be used to better inform private actions and evidence-based public policy.
  - More so in times of crisis.
- Yet, compilation of key economic statistics - National Accounts, Censuses - is a slow (and costly) process
  - Surveys are possible, but sparse and specialized
- This scarcity of economic data is all the more perplexing in a world awash with "naturally occurring data".
- Data held by commercial banks is potentially very fruitful
  - Rich, plentiful, granular, and directly connected to economic behavior,
  - Enabling real-time tracking of economic activity.

Research Questions

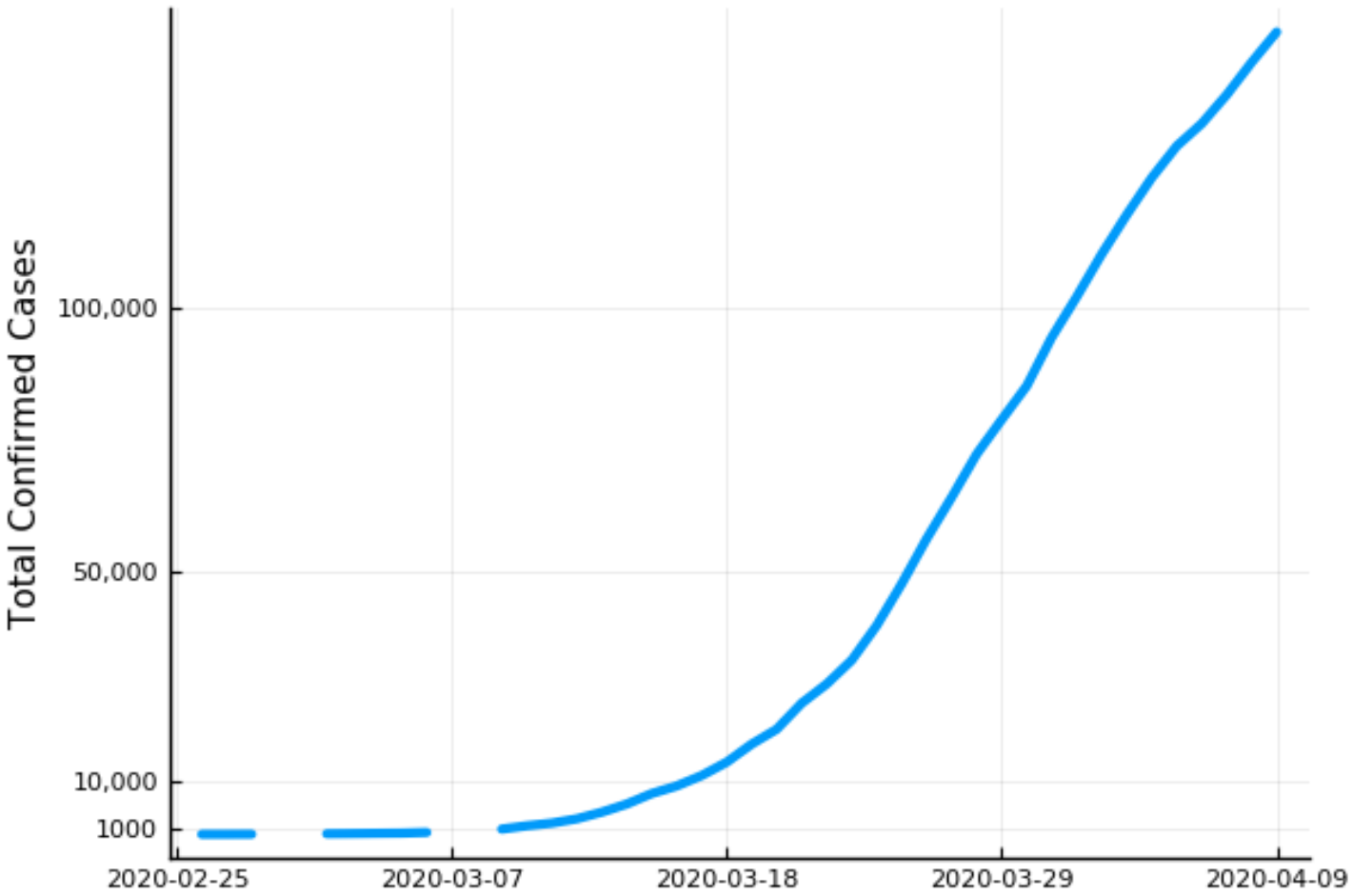
- Can transaction data provide insights into the unfolding of an economic crisis - in Spain - in real time?
  - What is the decline in consumption following a lockdown?
  - How large is the reallocation of expenditure?
  - How large is substitution towards online expenditures?
  - Are these patterns uniform across space?

- Part of a larger ongoing collaboration to construct:
  - High frequency/high geographic resolution National Accounts
  - Mapping economy-wide supply chains from firm-to-firm transaction data

Background on Data

- Data consists of:
  - Universe of transactions at BBVA-operated Point of Sales (PoS) +
  - Universe of transactions by BBVA-issued credit and debit cards
  - Jan 1st 2019-30th of March 2020 (1st Covid infection in spain: Jan. 31st)
- Large, tagged dataset:
  - 1.4 Billion Transactions
  - 2.2 Million Merchants (PoS) + 90 Million National Cards.
  - Geo-tagged + Sector of Expenditure + Online/Offline Breakdown
- Highly correlated with National Accounts Consumption data:
  - Correlation of Quarterly Aggregate of BBVA data vs. National Accounts NonDurable Household Consumption is >86%

A Chronology of the Corona Crisis in Spain



Accumulated number of confirmed cases of COVID-19 in Spain. Source, Ministerio de Sanidad. Centro de Coordinación de Alertas y Emergencias Sanitarias.

Note: 15th of March, General Lockdown Imposed

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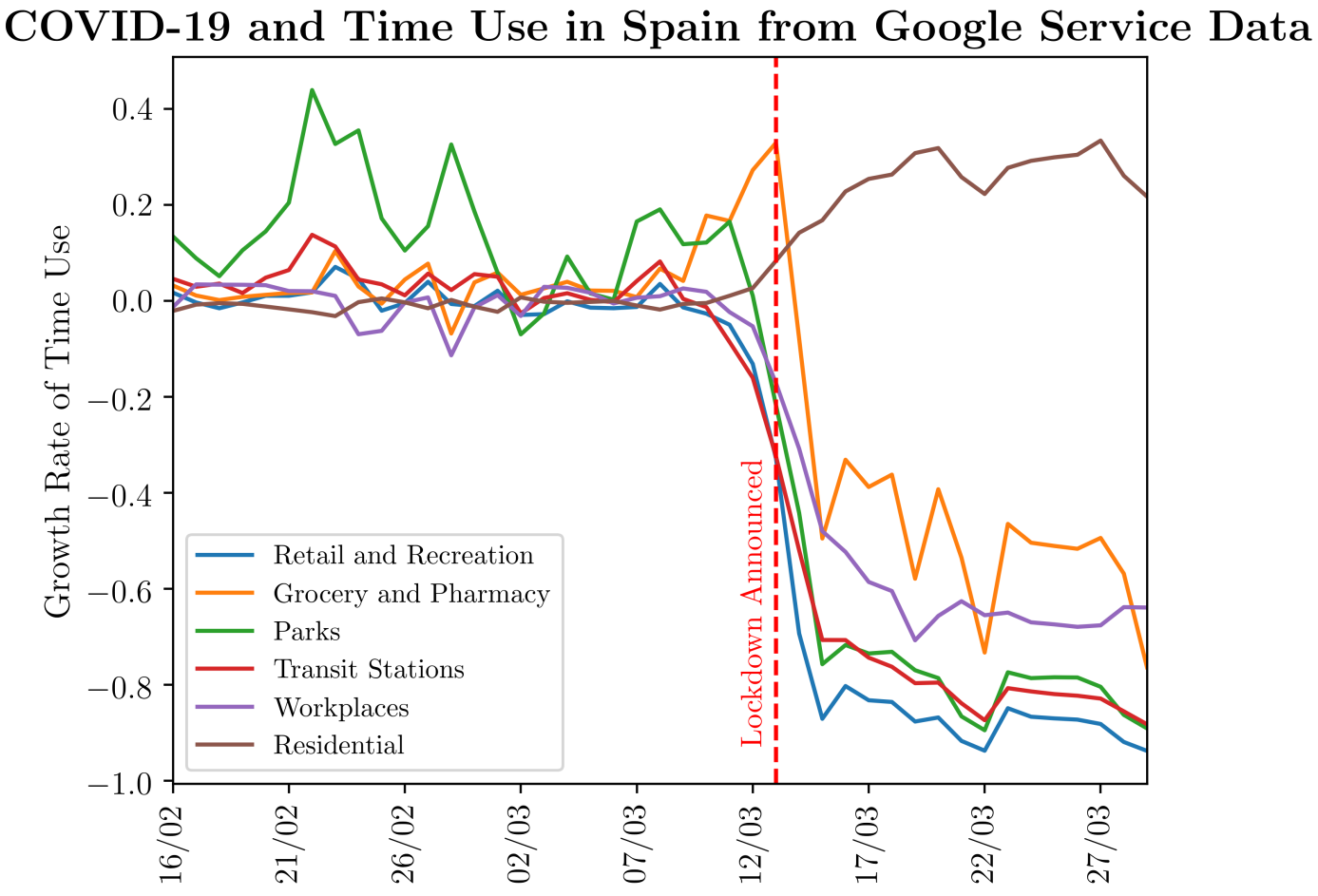
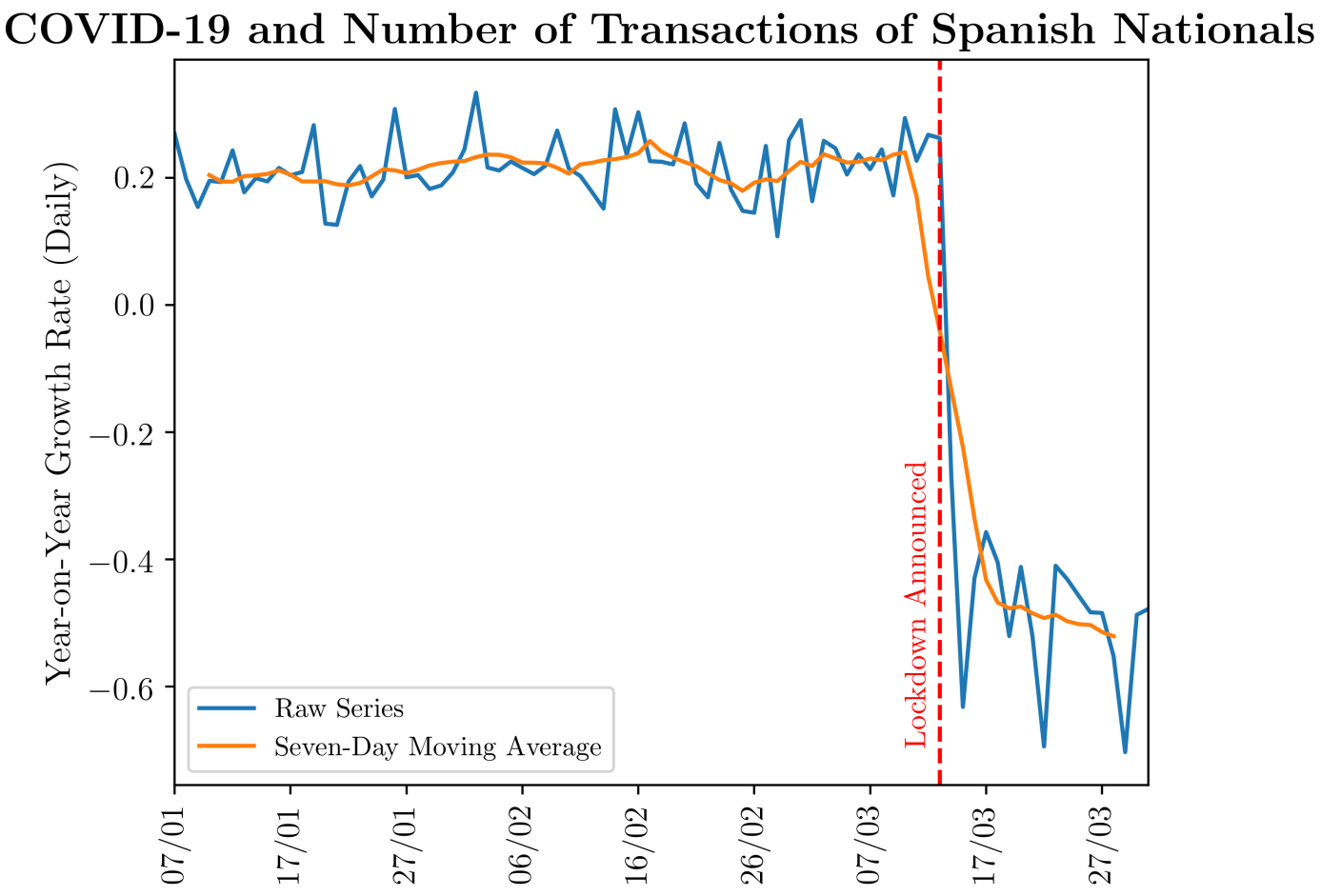


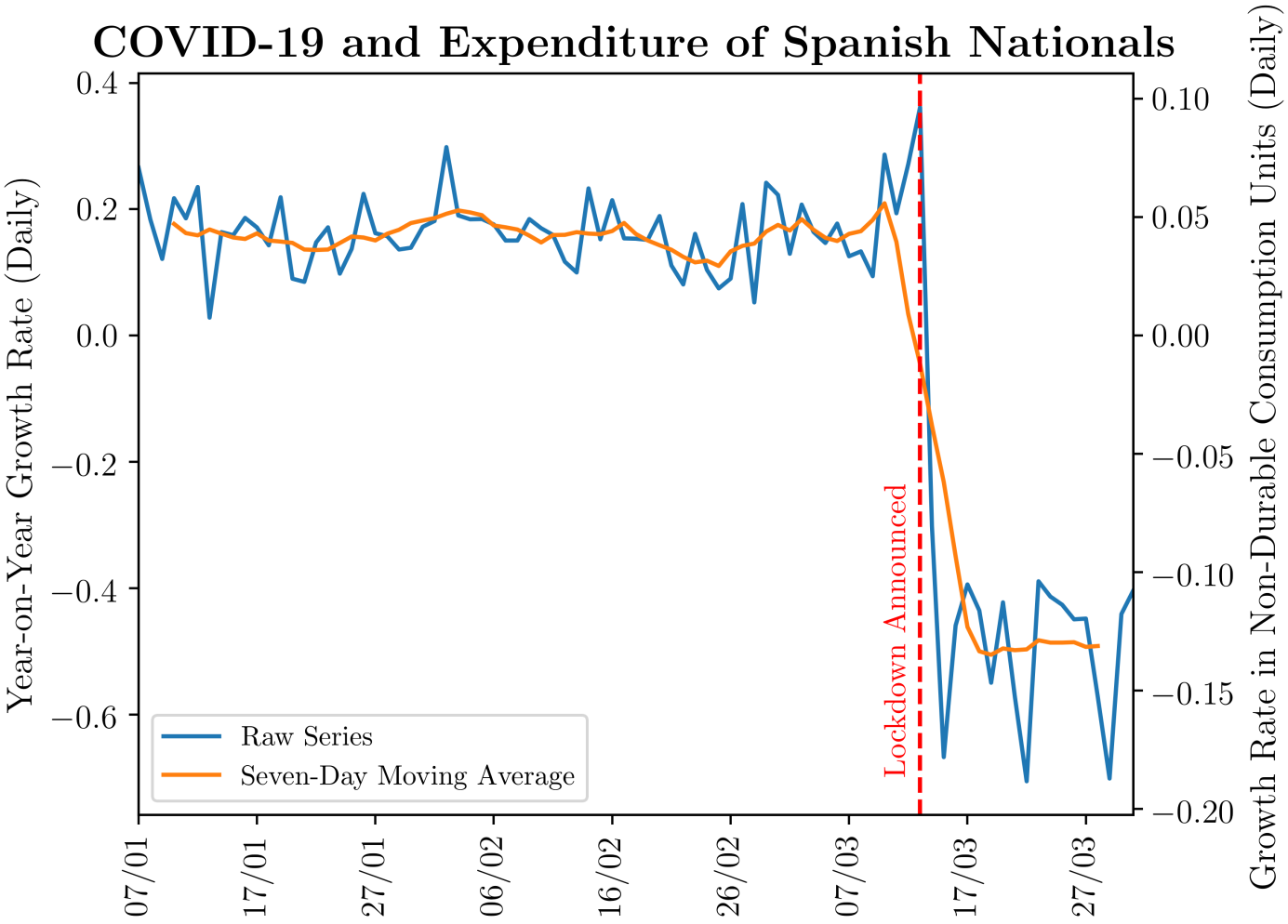
Growth rate across categories of time use by Google services' users in Spain. Computed by Google from location metadata generated by individual users and aggregated to a Spain-wide growth rates by location category. Source, Google Mobility Reports (2020).

A Chronology of the Corona Crisis in Spain



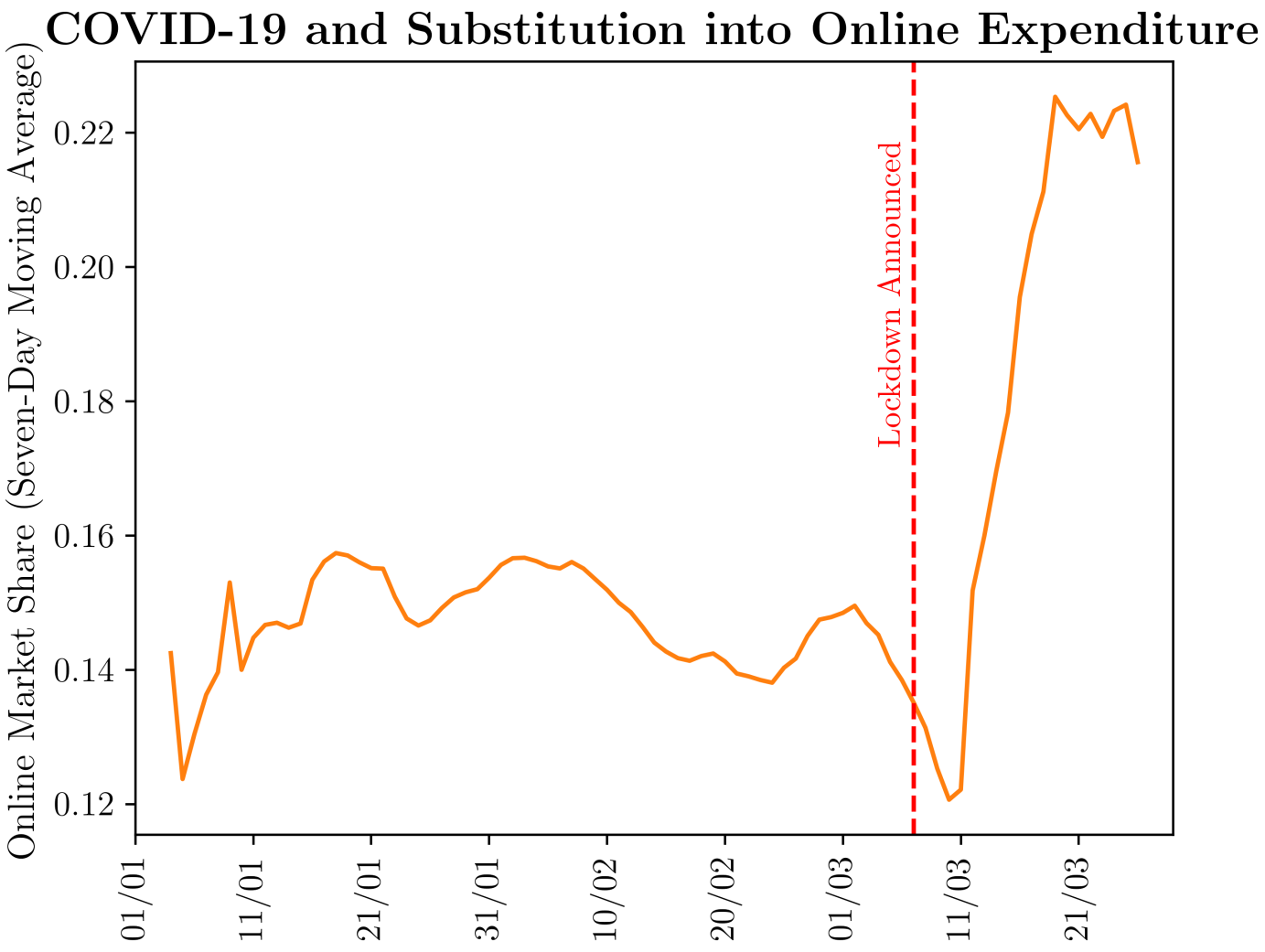
Year on Year growth rate of daily number of transactions settled with Spain-issued debit or credit cards. Blue line: Raw data. Orange line: seven day, centered moving average of raw data.

Aggregate Consumption Expenditures



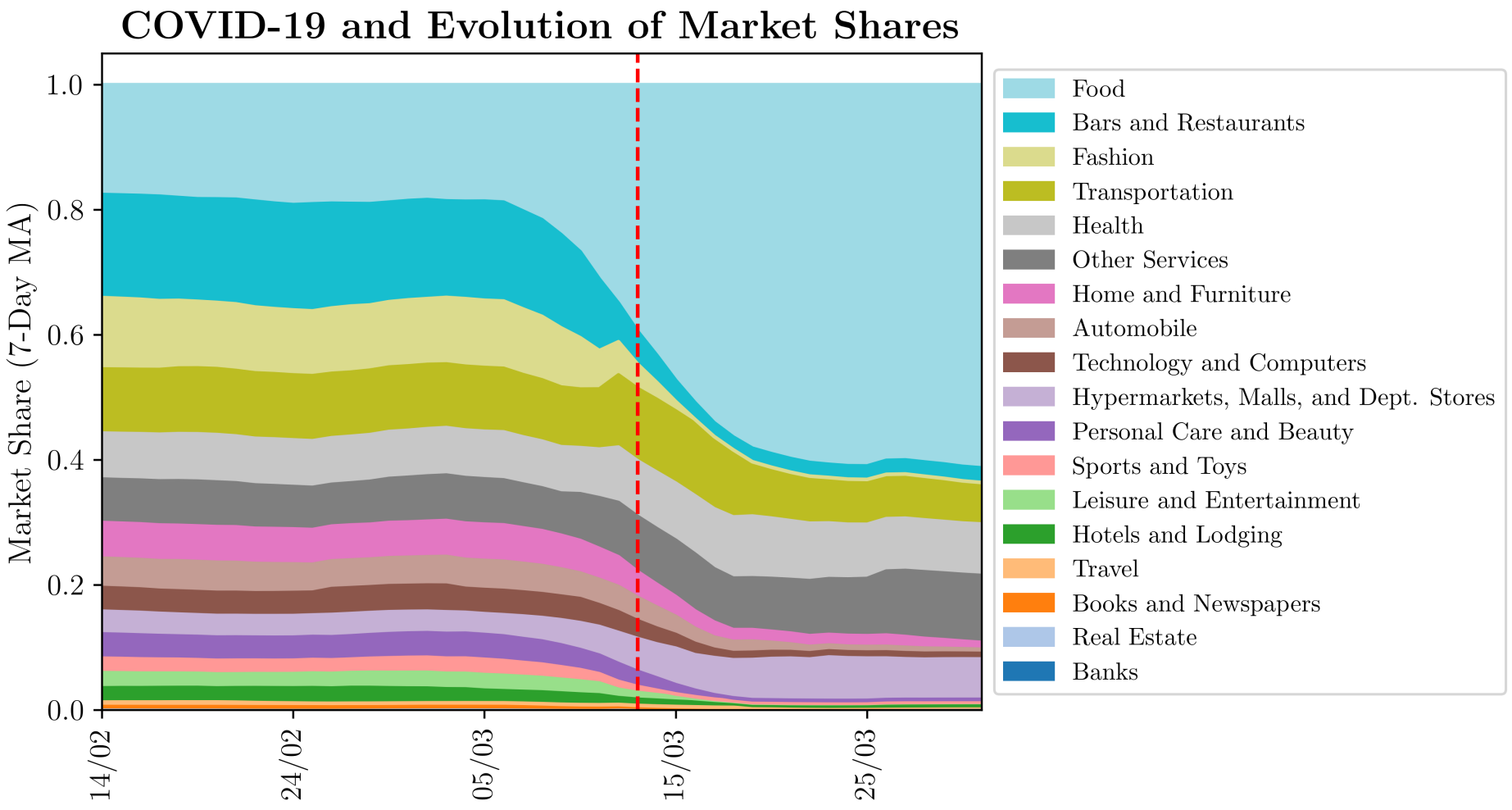
Year on Year growth of daily total expenditures by nationally-issued cards. Blue line: Raw data. Orange line: seven day, centered moving average of raw data. Left Y-axis: BBVA daily expenditure growth; Right Y-axis: Implied aggregate non-durable consumption growth daily Y-o-Y growth by rescaling expenditure growth.

Online vs. Offline



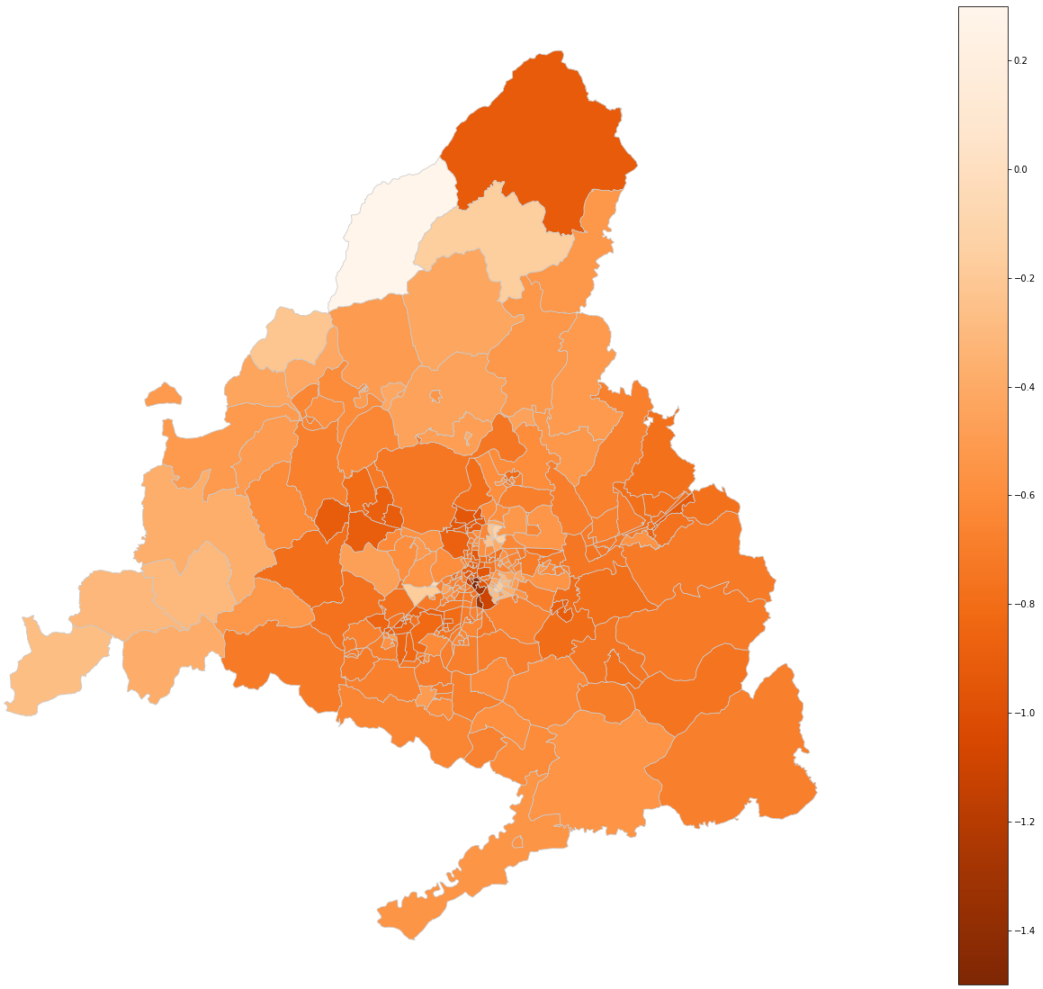
Seven day moving average of daily market share of online transactions by nationally-issued cards.

Reallocation of Expenditure



The evolution of market shares for broad expenditure categories. Categories are stacked top to bottom in order of pre-crisis shares. The red dash indicates the announcement of the lockdown. Shares are expressed as a seven-day moving average.

Local Dynamics: Zip Codes in Madrid



Heat Map of Difference in average Y-o-Y growth rate of expenditures before March 9th, and after March 13th. Darker color indicates a larger fall after the implementation of the lockdown.

Take Home Points

- +40% Decline in Expenditures: coinciding with lockdown.
- Doubling of Online Market Share: will it persist post-crisis?
- Large Reallocation of Expenditures: some merchant categories disappear altogether, will merchants come back?
- Some Spatial Inequality: Poorer districts and districts with more cases affected the most.

- Ongoing work:
  - Cross Country Data (US, Mexico, Turkey, Argentina...)
  - Inequality across Households (Age, Income, Occupation, Savings, Debt)
  - Inequality across Firms (Size, Age, Sector, Liquidity, Investment, Savings)
  - Track (slow + heterogeneous) recovery as lockdown scales back