

Tracking the COVID-19 Crisis with High Resolution Transaction Data

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Introduction

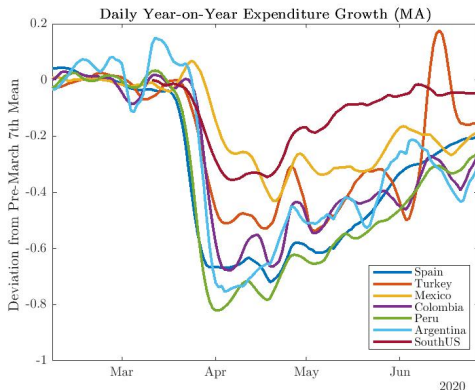
- World awash with “naturally occurring transaction data”.
 - COVID-19: first recession economists have a real time microscope available.
 - Likely to assume increasingly prominent role in research and policy.
- This paper: benchmarks properties of a large scale transaction dataset
+ provides COVID-19 proof of concept.
- Economic consequences of the pandemic:
 - Estimates of costs for different lockdown restrictions on expenditure
 - Unequal burden in expenditure adjustment across income groups
- Economic drivers of the pandemic:
 - Differential mobility (to work) induced unequal disease outcomes across income groups

Overview of BBVA Transaction Data

- Data for Spain consists of:
 - Universe of transactions by BBVA-issued credit and debit cards +
 - Universe of transactions at BBVA-operated Point of Sales (PoS)
 - Jan 1st 2019-26th of June 2020
- Large, tagged dataset:
 - 2.1 Billion Transactions
 - Geo-tagged + Sector of Expenditure
- BBVA Cardholders
 - 6 million cardholders
 - Home Postal Code (use to proxy income)
- International data from BBVA affiliates:
 - Argentina, Colombia, Peru, Mexico, Southern US States and Turkey
 - 3.8 Billion transactions

Tracking the COVID-19 Crisis in Real Time

A Global Expenditure Contraction



p.p. differences from
pre-March 8th mean growth

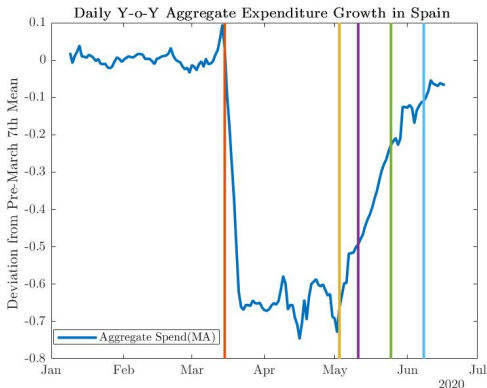
- Global Expenditure Y-o-Y Daily Growth
- V-ish recovery patterns but
- Substantial cross-country heterogeneity
- High correlation with mobility declines

Roadmap

- ① **Economic consequences of the pandemic:**
 - ① **Estimates of costs for different lockdown restrictions on expenditure**
 - ② Unequal burden in expenditure adjustment across income groups
- ② Economic drivers of the pandemic

Tracking the COVID-19 Crisis in Real Time

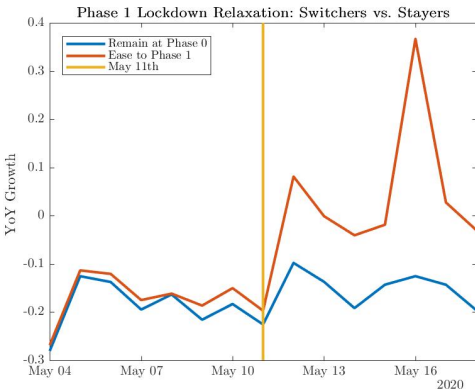
Zoom in on Spain



- Sharp decline on March 15th national lockdown
- Recovery when nationwide lockdown easing process starts (May 4th)
- **Phase 1 Easing** (May 11th): reopening of small/medium retail under capacity restrictions
- **Phase 2 Easing** (May 25th): reopening of large retail/malls + milder capacity restrictions
- **Phase 3 Easing** (June 8th): loosening of capacity restrictions
- **We exploit differential timing in intensity of easing across provinces**

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Province-level Variation in Timing + Extent of Easing

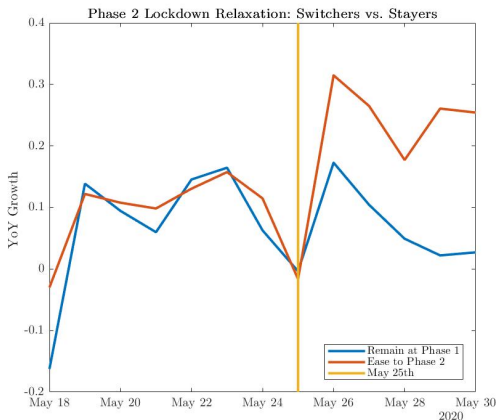


- Use geo-tagging of transactions to define province level time series of expenditures
- Phase 1 Easing (May 11th)
- Reopening of small/medium retail under capacity restrictions
- Some provinces enter Phase 1; some do not.

Phase 1 Easing: Switchers vs. Stayers

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Province-level Variation in Timing + Extent of Easing

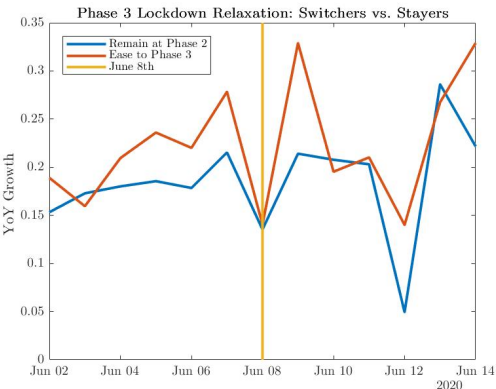


- Phase 2 Easing (May 25th)
- Reopening of large retail/malls + milder capacity restrictions
- Some provinces enter Phase 2; some do not.

Phase 2 Easing: Switchers vs. Stayers

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Province-level Variation in Timing + Extent of Easing

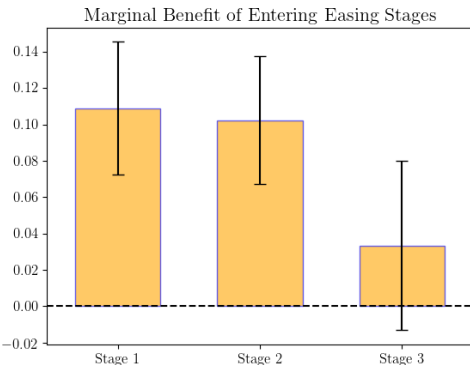


- Phase 3 Easing (June 8th)
- Loosening of capacity restrictions
- Some provinces enter Phase 3; some do not.

Phase 3 Easing: Switchers vs. Stayers

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D-i-D Estimates



- D-i-D estimates of province daily Y-o-Y expenditure growth on easing phase dummies
- Controlling for daily disease incidence in province.
- Extensive margin/size dependent shutdowns more damaging than capacity restrictions, conditional on being open.

Roadmap

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 - ② **Unequal burden in expenditure adjustment across income groups**
- ② Economic drivers of the pandemic

Reallocation of Consumption During COVID-19

Rich vs. Poor

Categories most and least correlated with postal code income in 2019:

High-Income Categories		Low-Income Categories	
Category	Corr. with Income	Category	Corr. with Income
Taxi	0.67	Gas Stations	-0.48
Sports	0.62	Supermarkets	-0.35
Beauty & Hairdressers	0.58	Car Technical Inspection	-0.35
Restaurants	0.58	Telephony	-0.26
Parking	0.53	DIY: Small Retail	-0.25
Fashion: Small Retail	0.42	Insurance	-0.25
Mid- & Long-Distance Trains	0.41	Tobacco	-0.23
Pharmacy	0.40	Auto Sales/Repair/Parts	-0.23
Travel Agency: Physical Location	0.38	Veterinary	-0.22
Bars & Coffee Shops	0.37	Miscellaneous	-0.18

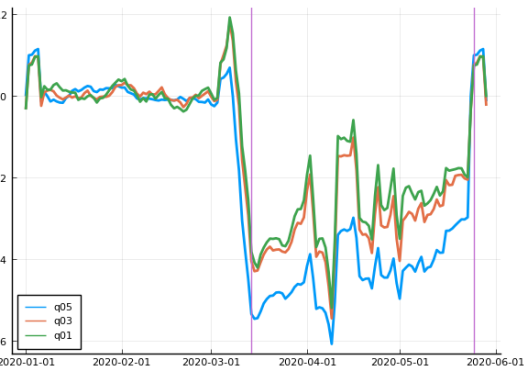
Restricted during lockdown

Rich consumption basket: social and luxury goods; market production.

Poor consumption basket: essential services; home production.

Reallocation of Consumption During COVID-19

Rich vs. Poor

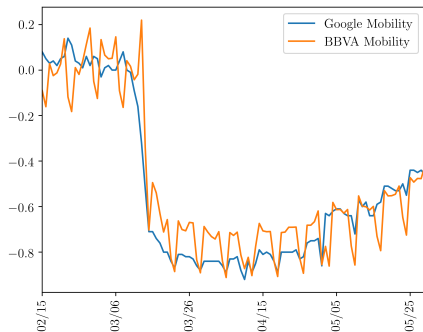


- Higher income postal codes decreased spending most
 - Why? The rich are forced the consumption patterns of the poor.
- In paper: D-i-D setting + postal code disease incidence control:
 - Richest quintile's expenditure declines by 30p.p. more than poorest quintile

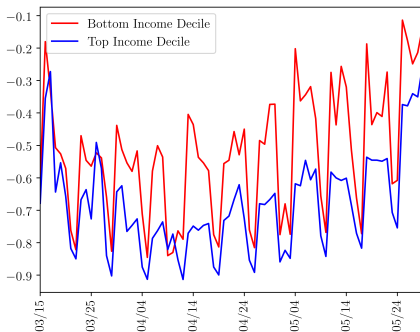
Roadmap

- ① Economic consequences of the pandemic
- ② **Economic drivers of the pandemic**
 - **Differential mobility (to work) induced unequal disease outcomes across income groups**

Transaction data as a Real Time Mobility Proxy



(a) Transport Spending vs Mobility



(b) Transport Spending and Income

Google Mobility: percent change in time spent at work + transit stations as measured through mobile phone usage.

BBVA Mobility: percent change in national spending on transport categories, i.e. Bus, Trains, Urban Transport; Gasoline, Parking, Tolls, Taxi.

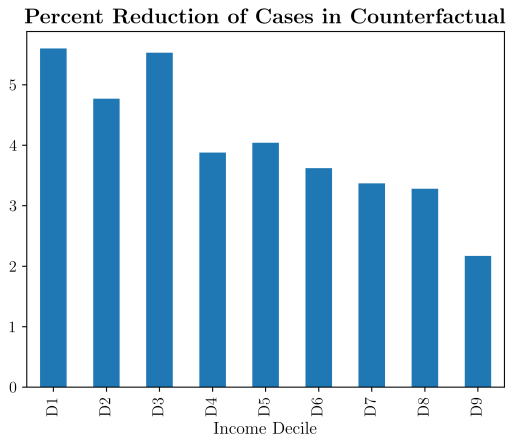
Urban Transport as a Predictor of Disease Incidence

Accumulated Incidence in Postal Code		
Per capita Income ($\times 10^4$)	0.000036 (0.000043)	0.000015 (0.00042)
Older than 65 ($\times 10^4$)	3.191*** (0.35)	2.268*** (0.42)
Spending in Urban Transport ($\times 10^4$)		29.22*** (7.459)
N	286	286
R^2	0.255	0.299

1 S.D. increase in postal code urban transport spending leads to a 10% increase in cases per capita

In paper: Poisson panel regression on count of daily cases

Urban Transport, Income and Disease Incidence



We impose on postal codes outside the top income decile the urban transport spending reduction of the top-income decile.

Use estimates from disease regression to predict reduction in COVID cases.

Take Home Points

- Card spending data increasingly common in many countries
- Validation against external data shows this data is simultaneously:
 - Coincident consumption proxy
 - Household budget survey
 - Mobility indicator
- Economic **consequences** of the pandemic:
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