

# Digital Payments, Behaviors and Predictive Analysis

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Doctoriales  $i^3$  - May 27 2020 (ZOOM)



# Background

- ▶ The study of the macroeconomy has long been limited by the frequency, accuracy and coverage of official data
- ▶ In recent years, however, many new data sources have become available through the electronic recording of economic transactions
- ▶ These new data sources have the potential to contribute to long-standing problems such as the time lag in economic monitoring
- ▶ As well, it has become possible to study new questions which cannot be addressed with monthly official data:
  - ▶ Weekly, daily or intra-day patterns of online and offline consumption
  - ▶ Very short-term and localized consumption responses to events

# Background

The present thesis is concerned with such new research directions. It intends to use and promote card payment data in a perspective:

- 1 To better predict economic activity over time and at different levels of aggregation (geographical and sectoral)
- 2 To measure the impact of online payments (and new payment technology) on household consumption expenditure
- 3 To investigate the causal impact of anticipated or unanticipated events on economic activity

# Outline

- 1 Motivation
- 2 Paper 1: New payment Technology Adoption
- 3 Paper 2: Online Commerce and Gravity Model
- 4 Paper 3: Consumer Spending Response to COVID-19
- 5 Future Research

# Paper 1: Card-Sales Response to Merchant Contactless Payment Acceptance

## Motivation and Research Questions

- ▶ Disruptive innovations in digital payments are happening in a large number of countries around the world, especially in Asia and Europe
- ▶ Starting from 2012, the French major banks have decided to massively issue cards with contactless technology

# Paper 1: Card-Sales Response to Merchant Contactless Payment Acceptance

## Motivation and Research Questions

- ▶ Disruptive innovations in digital payments are happening in a large number of countries around the world, especially in Asia and Europe
- ▶ Starting from 2012, the French major banks have decided to massively issue cards with contactless technology
- ▶ What is the impact of this new technology on merchant card sales?
  - ▶ Do accepting a new payment technology allow merchants increasing their business sales?
  - ▶ Is the impact the same according to sectors (e.g. restaurants, hotels), and the size of business (small versus large merchants)?
  - ▶ What is the effect on the use of other accepted payment methods (spillover effects)?

# Card-Sales Response to Contactless Payment

## Main Findings

Using score matching and difference-in-difference setting:

- ▶ Our results suggest that the introduction of contactless payments promotes business growth, especially the small merchants, new entrepreneurs and businesses that make small amount per purchase, such as bakeries, restaurants
- ▶ The acceptance of contactless payments has positive spillover effects on old payment methods and is a tool to attract more consumers

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## Contributions

- ▶ First paper that investigates the causal impact of new payment technology on merchant sales
- ▶ One of the first contributions to the literature on the effects of financial technologies (Fintech) on the real economy



# Paper 2: Online Commerce, Inter-Regional Retail Trade, and the Evolution of Gravity Effects

## Motivation and Research Questions

- ▶ Retail e-commerce is growing quickly and now represents a significant proportion of household final consumption expenditure (21% in Fr)
- ▶ Little is known about the ways in which consumer mobility and economic relations between region have been modified by e-commerce

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- ▶ Little is known about the ways in which consumer mobility and economic relations between region have been modified by e-commerce
- ▶ Does the geographical location still continue to play a key role?
- ▶ How are the inter-regional retail trade linkages and the changes in the gravity effects between regions altered by online commerce, as opposed to traditional point-of-sale (off-line) commerce ?
- ▶ Is the gravity model still valid ?

# Online Commerce and Evolution of Gravity Effects

## Main Results

- ▶ We build original inter-regional retail trade measures from 20 billion consumer online and in-store transactions made through bank cards
- ▶ We find that gravity relationships have been changed by the availability of e-commerce; distance is a less strong predictor of online trade
- ▶ The increasing movement toward online purchasing may tend to increase the concentration of economic activity, and may have important implications for regional economic development

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## Contributions

- ▶ One of first papers that investigate the impact of online commerce on inter-regional retail trade
- ▶ Contribution to the literature that analyses 1) the ways in which geographic frictions reduce inter-regional trade, 2) geographic patterns of trade between individuals using online transactions, and 3) the local structure of consumption industries

# P3: Consumers' Mobility, Expenditure and Online-Offline Substitution Response to COVID-19

## Context and Research Questions

- ▶ Since the end of 2019, from Asia to Africa via Europe, the whole world has been going through an unprecedented crisis named COVID-19
- ▶ To halt the spread of infection, major policy measures have been put in place, and have led to a sharp decline in output in many economies
- ▶ Faced with a significant shock, economic agents must adapt: the nature, degree of that adaptation may limit the impact of the shock

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- ▶ Faced with a significant shock, economic agents must adapt: the nature, degree of that adaptation may limit the impact of the shock
- ▶ How has mandatory containment reduced consumer mobility?
- ▶ What is the impact of the containment due to the COVID-19 epidemic on the French consumer spending (hourly, daily and weekly)?
  - ▶ Is the impact the same according to sectors (essentials vs non essentials), the size of cities (Paris vs other cities), and the channel (offline vs online)?

# French Consumers Response to COVID-19

## Some Results

- ▶ On average, a CB travelled 1/4 of the distance during the containment
- ▶ A significant drop in activity of about 60% during containment. The overall decline is greater at the end of the day and week



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- ▶ Online activity is much less affected by the restrictions on physical movement of consumers. It is twice as great as the declines (-30%)
- ▶ The impact of the containment differed across types of business. Essential activity is unsurprisingly and naturally less affected
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- ▶ The decline in the value of transactions during the containment is substantially greater in Paris than elsewhere

# Conclusion and Future Research

Many interesting directions for future research

- ▶ COVID-19

- ▶ Examining the emergence of the economy from the period of disruption, and the dynamic path of consumption recovery by sector
- ▶ At consumer level: Investigating the heterogeneity of consumption shocks in the population
- ▶ At firm level: Identifying income shocks and predicting fragility risks
- ▶ Nowcasting: improving models for predicting health outcomes

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  - ▶ Examining the emergence of the economy from the period of disruption, and the dynamic path of consumption recovery by sector
  - ▶ At consumer level: Investigating the heterogeneity of consumption shocks in the population
  - ▶ At firm level: Identifying income shocks and predicting fragility risks
  - ▶ Nowcasting: improving models for predicting health outcomes
- ▶ (Un)Anticipated shocks
  - ▶ Climate Change, Extreme Weather Events and Consumer Behaviour: Evidence from the European Heatwave
- ▶ Nowcasting model for economic activity (e.g. GDP) at geographical and sectoral levels

Thank you for your attention !

## References

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