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Economic impact of world-wide coronavirus pandemic on SMEs in Cambodia

Preliminary analysis on real-time data from an accounting platform

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Outline

1. Introduction
2. Reviews of Studies on coronavirus pandemic and its economic impacts
3. Data and real-time analysis on impacts of COVID-19
4. Conclusion and limitations

Introduction

- Spread of COVID-19 seriously affected the economies over the worlds.
- A government of each country tries to make prompt policy measures, such as providing financial aids to SMEs, and central banks try to increase liquidity in the financial markets by loosening monetary policy rate or quantitatively increasing monetary supply.
- However, these policy measures in turn pose risks of increasing other issues in the future, such as debt overhanging and forbearance lending for SMEs (Bircan et al., 2020).
  - If subsidized firms go default afterward, such injected subsidies could become waste of money for the economy
  - There were several cases of fraudulent recipients of subsidies designed to support small businesses and self-employed people hit seriously by the pandemic are increasingly being found across Japan in 2020. (Japan Times, Sep 27, 2020)

- The problem is the difficulty in identifying which firms really need a government support in response to COVID-19 shocks in developing countries.
- Improving availability of data is the crucial issue.

Introduction

- We introduce a novel database and a method of real-time analysis using such database.
  - Financial statements of firms registered in private accounting company

- Recently, this kind of database is increasingly available and often used for policy-oriented researches in developed countries.
- It is particularly beneficial for the developing countries due to the lack of publicly available comprehensive data.

- Although our analysis is still preliminary, this present paper suggests that the data from private businesses could be useful and powerful for gauging the economic situation on a real-time basis.

Studies on coronavirus pandemic and its economic impact

- One of the biggest challenges in decision of macroeconomic policy to address the impact of coronavirus pandemic is the limitation of data availability
- Although such statistics are helpful to understand the troubles and challenges in the economy, such data are available with a significant lag, which is recognized clearly as limitation due to the corona pandemic.

Studies on coronavirus pandemic and its economic impact

- One of the possible ways to address such issue is to carry out interviews or to distribute questionnaires.
- After the world-wide coronavirus pandemic occurred, Beck et al. (2020) conducted a survey on about 500 listed firms in 10 emerging economies.
  - The majority of firms experienced the decline in investment and sales. Approximately half of firms have received or expected to receive government support.
  - Firms' reaction is focused on short-term demand of their stakeholders, and protecting their labor and long-term relationships.
  - Most of Firms reacted to reduce the investment, while keeping or expanding employee benefits rather than cutting them.
  - Firms acted quickly before government measures, and provided the donations to the society or shifted operations to fulfill pandemic needs.

Studies on coronavirus pandemic and its economic impact

- However, questionnaire-based analysis could have problems of misreporting and biases toward nice answers.
- To address this issue, studies using the data from private sectors are increasingly available.

- Chetty et al. (2020) addressed this issue by accessing to high-frequency real-time data from business, such as payroll data and credit and debit card spending.
  - From high-frequency payroll data from the U.S., Chetty et al. showed that labor market impact of coronavirus pandemic in the US has been concentrated among lower income earners.
  - By the September 2020, the job market for the top quantile of US workers recovered. In addition, from card spending data, Chetty et al. showed that consumer spending has reduced after the coronavirus pandemic, and the reduction mainly came from reduction in spending by high-income households. In the meantime, low-income households did not reduce their spending so much.

Recent evolution of cloud-based accounting software

- Due to development of cloud services, the cost of managing large database became lower for private and public firms.
- One of the advantages of diffusion of such technologies is that the data of firms adopting the technologies can be collected in a centralized database.
- The cloud-based accounting software is one of the example of recent evolution of ICTs. This new technologies are now increasingly adopted by the firms in developed countries, such as New Zeeland and US.

The case of Japan --- *freee K.K*.

- The cloud-based accounting software “freee K.K.” can be used as a cloud service for automation of accounting operations, digitization of ordering operations, systematization of invoicing, automation, and payment management.
- “freee K.K.” is now collaborating with regional banks, in order to reduce the information gap between banks and firms.
- For lending, regional banks can access to the data of financial statements of the firm

Recent evolution of cloud-based accounting software in Cambodia

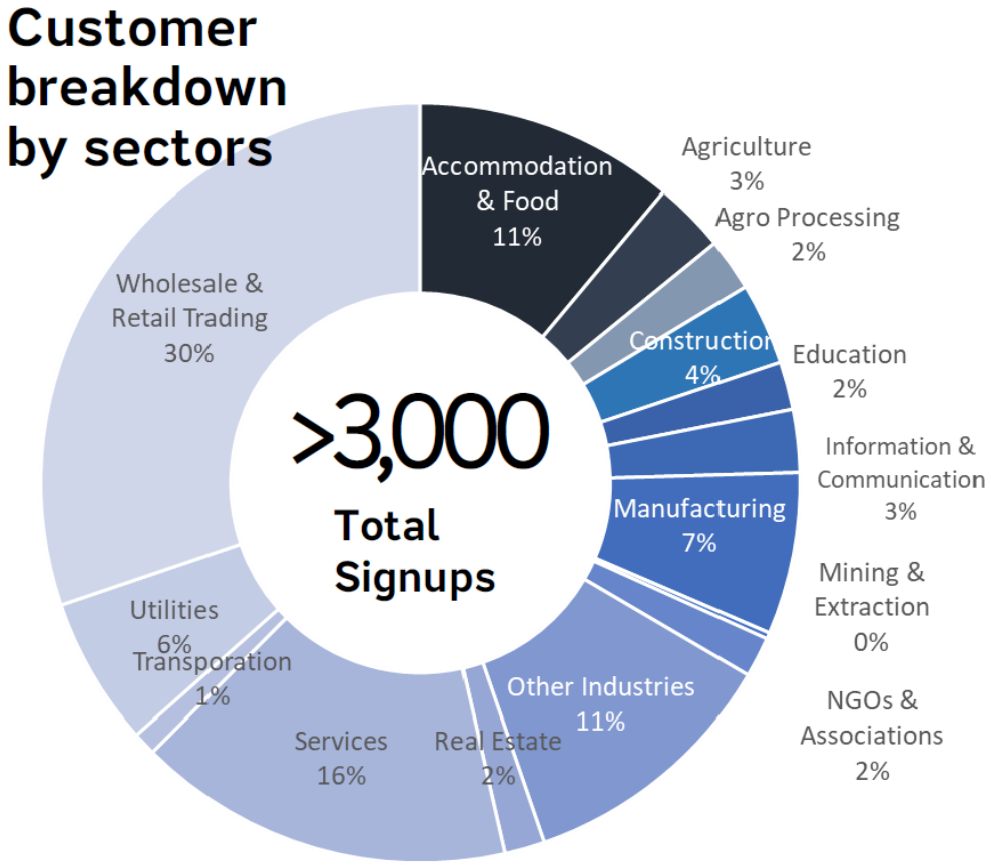
- **Banhji Fintech Ltd.** is the first company to develop cloud-based accounting software for Cambodian SMEs and microenterprises.

- Data recorded by SMEs are kept and centralized at a cloud server, and allow for analyzing the trend in the entire SME clients of Banhji.
- Recently, there are more than 3000 firms using the accounting software of Banhji Fintech. Ltd.

- Firms can keep a financial record and install the point of sales in their operations.
  - Financial Statement
  - Point of Sales

- Advantage of the data
  1. Data is available <u>on real-time basis</u>
  2. <u>High frequency</u> (on a monthly, weekly, or daily basis)

Figure 1: Breakdown of Registered Firms in Banhji's Platform



*As of 2019

Data for analysis

We analyze the financial statement of selected firms registered in Banhji Fintech. Ltd

- Data are anonymized in the sense that company names are removed from the data before the analysis.

Sample size: 375 firms

Period: 2019M3-2020M5 (Monthly)

- We aggregated the total sales per month for each company

Maine variables

- Monthly sales
- Monthly expenses

Caveat:

- Most of the firms in our sample are wholesales and retail services.
- Although the manufacturing and tourism sectors are most affected by corona pandemic, our analysis can not provide an implication for those sectors.

Regression analysis

- Capture the macroeconomic trends in the monthly data
- We estimate the trend using the following equation

$$ln\ Sales_{it} = \alpha + f_i + f(time_t) + \epsilon_{it} \quad (1)$$

$$ln\ Expense_{it} = \alpha + f_i + f(time_t) + \epsilon_{it} \quad (2)$$

$ln\ Sales_{it}$	Total Sales per month of company *i*
$ln\ Expense_{it}$	Total expenses per month of company *i*
$f(time_t)$	4th order approximation of time trend
f_i	Firm-specific effect
ϵ_{it}	White noise

Regression analysis

- The caveat in analyzing firm data is that there are entries and exits of firms over the time. Thus, even though the simple sample average of each period shows there is decline in sales after the coronavirus pandemic, it might reflect a drop of some firms with high sales.
- To reduce the biases, we included firm-fixed effects ($\boldsymbol{f_i}$)

- In the estimation, we divided firm sample into large and small depending on amounts of sales. We define firms as large firms if the sales are larger than median value of sales in the sample, and otherwise define firms as small firms.

Estimated macroeconomic trend $f(time_t)$

Table 1: Revenues

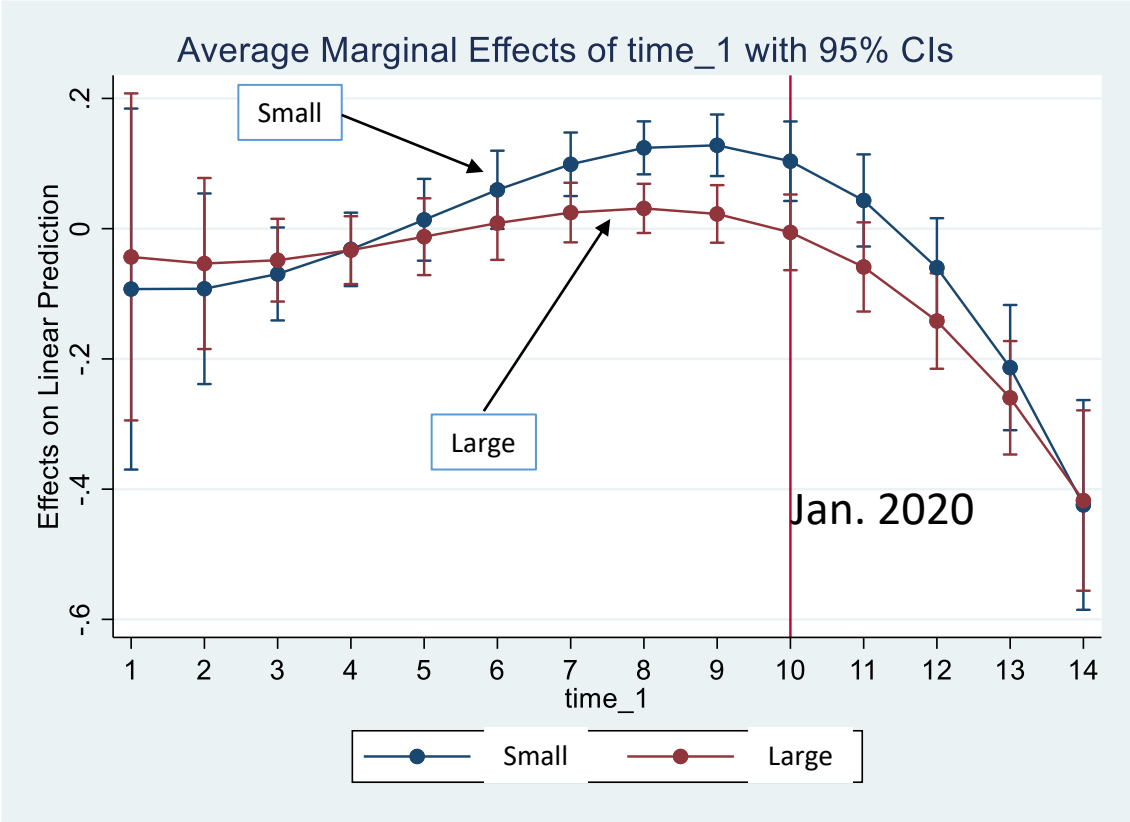
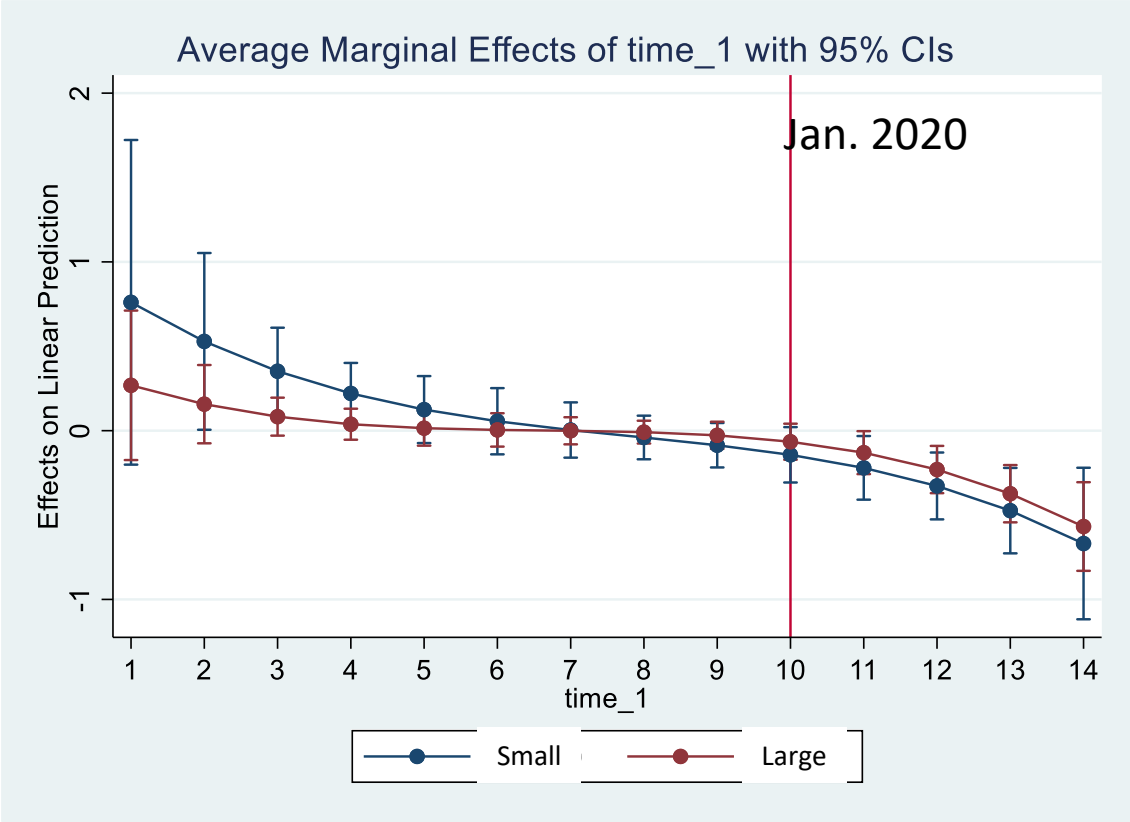


Table 2: Expenses



- Macroeconomic trend shows that the revenues and expenses are decreasing after Jan. 2020
- Decline in revenue and expenses are slightly larger for small companies. Smaller firms seem to be more affected by the coronal pandemic
- Macroeconomic trend is fluctuating more for small company than large company

Firm characteristics and impact of corona pandemic

- Which firms are particularly affected during this unprecedented pandemic-induced economic downturn?
- Again, we address this question by using the regression analysis

$$ln\ Sales_{it}$$

$$= \alpha + Corona_t * (\beta Cash\ Rich\ Indicator_i + \delta Large\ Dummy_{it} + \gamma KHRDummy_i) + f_i + \psi_t + \epsilon_{it}$$

$$ln\ Expense_{it}$$

$$= \alpha + Corona_t * (\beta Cash\ Rich\ Indicator_i + \delta Large\ Dummy_{it} + \gamma KHRDummy_i) + f_i + \psi_t + \epsilon_{it}$$

$Corona_t$ is the dummy variable which takes one from February 2020

Impacts of the crisis on cash flow

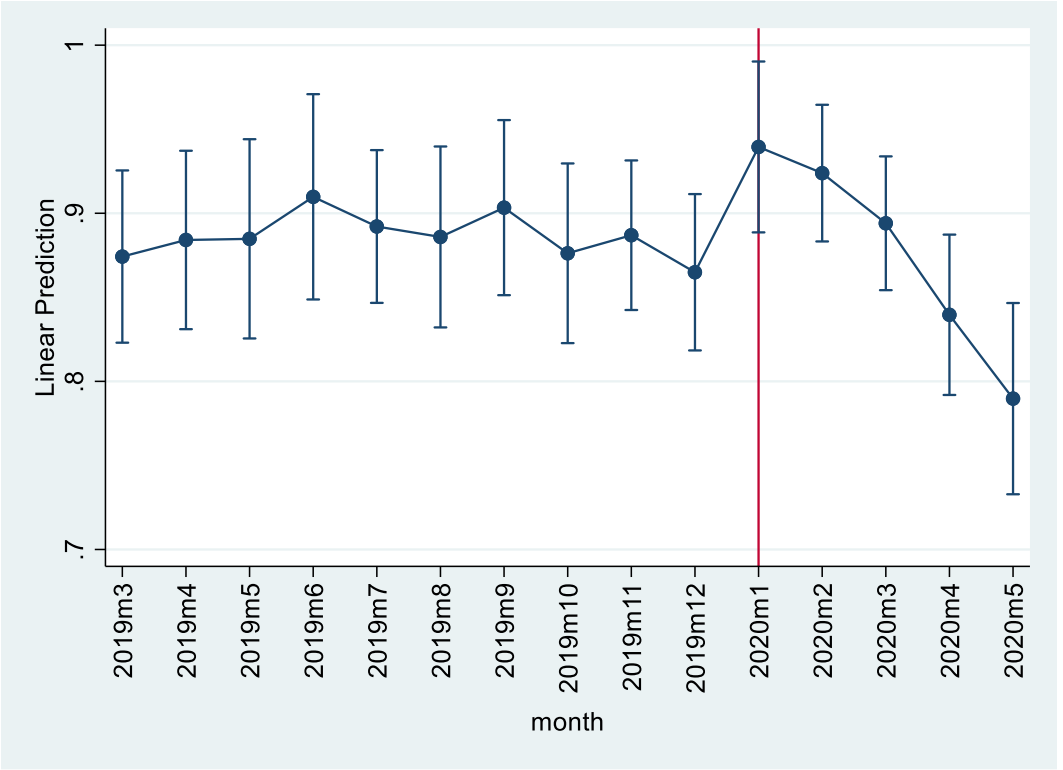
- We define the indicators for gauging the availability of internal funds as average of cash flow before the corona pandemic.

$$Cash\ Rich\ Indicator_i = \Sigma_{t=2019M4}^{2020M1} CashFlow_{it}$$

- The availability of internal funds is the important predictor whether firms can survive the economic downturn (Joseph et al, 2020; Acharya & Srteffen, 2020).

- Figure 3 shows that there is declining trend in cash flow after the January 2020, suggesting that firms have also experienced the decline in the cash flow as well as sales and expenses.

Figure 3: Trend in Cash Flow



Firm size and Local Currency Usage

- KHR dummy (It takes one if a company choose KHR as accounting units)
  - If firms use KHR as the accounting unit, the firms might be likely to receive and spend KHR currency. Firms use KHR could have more clients in local areas, while firms use USD are likely to deal with importing goods.
- Large Dummy (It takes one if a company is large in terms of sales)
  - Larger firms are likely to locate in Phnom Penh and to deal with importing goods. Thus, stop in population movement and trades of goods might affect larger firms more seriously.
  - In the meantime, larger firms are likely to have diversified customer-base and suppliers. It could make firms resilient even in the crisis period.

Results

- We estimated this model by using OLS with cluster-robust standard errors at firm level.
- KHR dummy was significantly positive. The results may suggest that the firms operating mainly local clients are less likely to be damaged by corona pandemic.

- We did not find the evidence that cash-rich firms can mitigate the decline in performance.
- The interaction terms of large dummy and corona period are negatively estimated in column 1 and 2. The results suggest that larger firms experienced larger decline in their business during the corona pandemic.

Table 1: Results of Estimation

	(1) ln Sales OLS	(2) ln Expenses OLS	(3) ln Sales OLS	(4) ln Expenses OLS
KHR_dummy	-0.146	-3.130***		
	[0.180]	[0.580]		
Large Dummy	2.652***	2.531***		
	[0.169]	[0.304]		
Cash rich indicator	0.009***	0.005		
	[0.003]	[0.005]		
KHR Dummy X Corona Period	0.178	2.280***	0.420**	1.311***
	[0.135]	[0.717]	[0.164]	[0.226]
Cash rich indicator X Corona Period	0.001	0.002	0.001	-0.001
	[0.002]	[0.005]	[0.002]	[0.003]
Large Dummy X Corona Period	-0.807***	-0.831***	-0.247	0.029
	[0.160]	[0.178]	[0.165]	[0.478]
Time Dummies	No	No	Yes	Yes
Firm Dummies	No	No	Yes	Yes
Constant	7.767***	7.096***	17.687***	10.488***
	[0.140]	[0.240]	[0.067]	[0.325]
F_value				
Number of Firms	170	106	170	106
Adj-R-squared	0.496	0.307	0.804	0.702
Observations	1611	736	1611	736

Note: The estimation is conducted by OLS method with fixed effects. The estimated coefficients of each model are presented in the table. Standard errors of estimated coefficients are also presented in each parentheses. We calculated cluster-robust standard errors at firm-level.The asterisks *, **, and *** represent the statistical significance at 10%, 5%, and 1%, respectively.

Conclusion

- Recent development of the digital platforms by private companies is the new opportunity for government to gauge the economic situation in real time.

- Our study proposed the alternative approach for policy makers to capture the economic situation during an economic crisis. Particularly, by using the local emerging business IT platform managed by Banhji, we analyzed the impact of coronavirus pandemic on Cambodian firms.

- From our preliminary analysis on the Banhji's firm accounting data, we find the following things
  - Wholesale and retail firms experienced an immediate drop in sales after January when corona pandemic started in China.
  - The firm's expenses dropped in response to the drop in sales, suggesting that dropping sales constrain the firm's spending possibly because the limited financial access for firms.
  - Larger firms have experienced larger drop in their expenses and sales.
  - Firms operating with KHR currency are likely to be less damaged.

Challenges and direction of the future study

- However, this study has several challenges to be addressed.
- First, firms in the IT platform is not necessarily the representative for general Cambodian firms. The firms in the data are the one using Banhji's accounting software, and biased in populated areas of the country.
  - However, the biases could be trivial in the time of economic crisis.

- Seasonality in the macroeconomic trend
  - Long-term data is required to consider the seasonality

Challenges and direction of the future study

- Second, because of limitation on the accounting skills of firms and purpose of using the software, accounting data are not necessarily completed for all the firms.
  - Firms use this accounting software for various purposes. Some of them use the software to make complete financial statement for tax payment and borrowing from formal financial institutions, while others use it to keep records of sales and expenses for better management.
  - Thus, the quality of data is different from firm to firm, and we cannot merely apply traditional econometric models which is used for analyzing financial statements of listed firms. In other words, it is needed to focus on some variables in the accounting data.

Challenges and direction of the future study

- **Making criteria for identifying/evaluating the quality of financial statements of the firms in the accounting platform**

- **Incentivize SMEs to report their true attributes (Industry, # of workers, info. of services, etc.)**
  - In the case of Banhji, the program with PPCB might have a potential to work as an incentive for firms to submit their information

- **Educating SMEs for better accounting skills**
  - In this regard, JICA is launching a new project for enhancing the accounting skills of the Cambodian SMEs, in order to fill the information gap between banks and firms.

Challenges and direction of the future study

- POS data could be also useful for understanding shifts of consumer preferences
  - Hodbod et al. (2020) showed that there could be long-term changes in the consumer preference.
  - In this case, the fiscal policy supports for impacted firms (such tourism and restaurants) will have smaller effects.