Master Thesis Research Proposal

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1 Proposed Thesis Title:

The Impact of Floods on Firm-Level Supply Chains: Evidence from India

2 Research Motivation

Floods are known to be the most commonly occurring natural disasters in India. Around 40 million hectares of land area (approximately a tenth of India's total land area) is understood to be flood prone[1]. Yet, the literature on the economic impact of floods is scant in India. Parida and Dash (2020) estimate the effect of floods on Gross State Domestic Product (GSDP) of Indian states from 1981-2011. Singh and Kumar (2013) analyse patterns and trends in the occurrence of floods in India and the associated damage. However, this study is just a descriptive analysis of the data. Through this thesis, the aim is to bridge this gap in the literature. More specifically, the aim is to provide concrete evidence on the impact of floods on firm level outcomes.

3 Proposed Research Idea

The idea is to focus on the supply chains of firms. I would like to measure the impact of floods on two levels. Firstly, the direct impact of floods on firm level outcomes such as growth rate of sales. This would be done through a reduced form Difference-in-Differences approach. Secondly, I would like to measure the indirect impact of a supplier or customer of a given firm being affected by a flood. For this, the main reference paper is Carvalho et al. (2021) who measure the propagation of the Great East Japan Earthquake shock in the production network of firms that were not directly impacted. The paper uses a general equilibrium model to estimate the macroeconomic risk caused by a break in the input-output linkages of firms. This is precisely what I would like to estimate for India.

However, the key difference being that Carvalho et al. (2021) is a single event study. So in my thesis, I would like to extend this general equilibrium model to take into account a multiple event structure over several years. This introduces significant endogeniety into the model as firms could dynamically adjust their suppliers and customers or even their own location based on the vulnerability of the area. To account for this, a reduced form analysis that takes into account some interaction terms would be considered. To be more concrete, this would be done in the spirit of Panigrahi (2021) in an attempt to build a similar endogenous production network. Through this, I expect to get a negative result of floods on firm level outcomes.

4 Data Sources

There are 2 types of data sources that would be required and used for this research. Firstly, the data on floods is taken from recent and novel initiative that builds a complete dataset of floods in India known as the India Flood Inventory. This data is publicly available. Secondly, for the firm level outcomes, the panel dataset known as the Annual Survey of Industries (ASI)

[1] As reported by the Natural Disaster Management Authority, Government of India.

published by the Government of India from 1988-2011 would be used. Since we do not have direct firm-level transaction data, we use the ASI to build a proxy for the production network through the products that a firm uses as inputs. I also exploit a the tax system of India pre-2017 which made it more expensive for firm's to buy from or sell to firm's outside the state they were in (Panigrahi, 2021). Based on this, I make the assumption that firm's trade only within their state to build the necessary production network, which is supported by the arguments of Panigrahi (2021).

References

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