Assess how Agricultural Income Shock Leads to Rural China Migration Decisions

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Abstract

This research aims to develop a better understanding of rural-rural migration decision-making in 1990s China, where rural-social relationships peaked due to the village lineage collective's conventions on land entitlements. Such land territorialization led villagers that did not have close kinship networks to allocate to poor quality land, therefore low income. This project serves to focus on the impact weather instability brings into migration choices, building on Professor Zhao's research in kinship networks and its economic influence.

After obtaining weathering and production data covering 297 rural villages that include farming intensive households, the primary work of this project is to find the weather stations that are closest to each village and systematically code the weather data, total production, and revenue to match the villages. Data from the years 1986 to 1999 was successfully obtained by gathering data from different sources, which can be used to analyze a series of migration costs by distance, suitability, ease of movement, consumption, etc.

Background

Chinese kinship is focused on cultural descent, shared economic interest, and shared moral economy, where an identifier of the lineage identity directly relates to owning land rights. Up until the early 2000s period, to qualify for village membership, residents must own land and familial graces and have lived in the village for at least three generations, where depending on how strict the rural village is on kinship qualifications, or levels of how close-knitted kinship is organizational wise, there would be different reasonings to force migration.

First, tenure security plays a role in incentivizing households to migrate. The recognition of land rights through land certificates provides guarantees and encourages temporary migration, or else if households face a high risk of losing part or all of their land, they will prefer to stay at home.

Second, due to territorialized space, another reason for migrations would be because of decent group factors such as bullying, withholding of irrigation water, and destroying crops of property, amd mostly social tensions.

Third, other environmental factors which would impact farming households in low production and sales, where they either migrate to another village that they wouldn't be upheld against due to last names and gain a richer land, or if unfortunately, not feasible, would go into trade, business, or a handicraft.

This project would specifically tackle the third main reason in rural-rural migration, in order to control the environmental factor for future further research.

Data Acquisition

The 297 villages chosen in this study is selected from 2001 Village Survey by the Agricultural Department Research Bureau of the CPC Central Policy Committee. In order to locate the nearest weather station to each village, the latitude and longitude was web-scrapped from google, the utilized a R package (WorldMet) to acquire the station ids. The daily precipitation data is obtained from the China Meteorological Administration, where other hourly measurements derive from the Integrated Surface Database recorded by the National Oceanic and Atmospheric Administration. From previous literature, only certain weather instruments were chosen in forming a linear regression model.

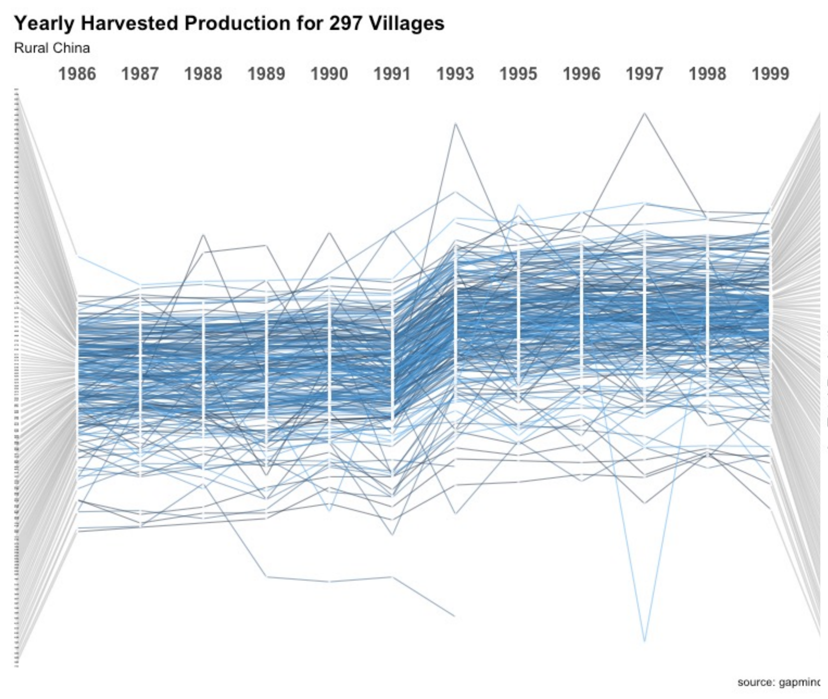
R_{lnspring} represents the log of average rainfall during the spring months (March, April, and May), doing so because 1) it is not possible to include every month in the analysis where there is high correlation in climate data from month to month, and 2) in the past literature reviews, spring precipitation is highly correlated with production.

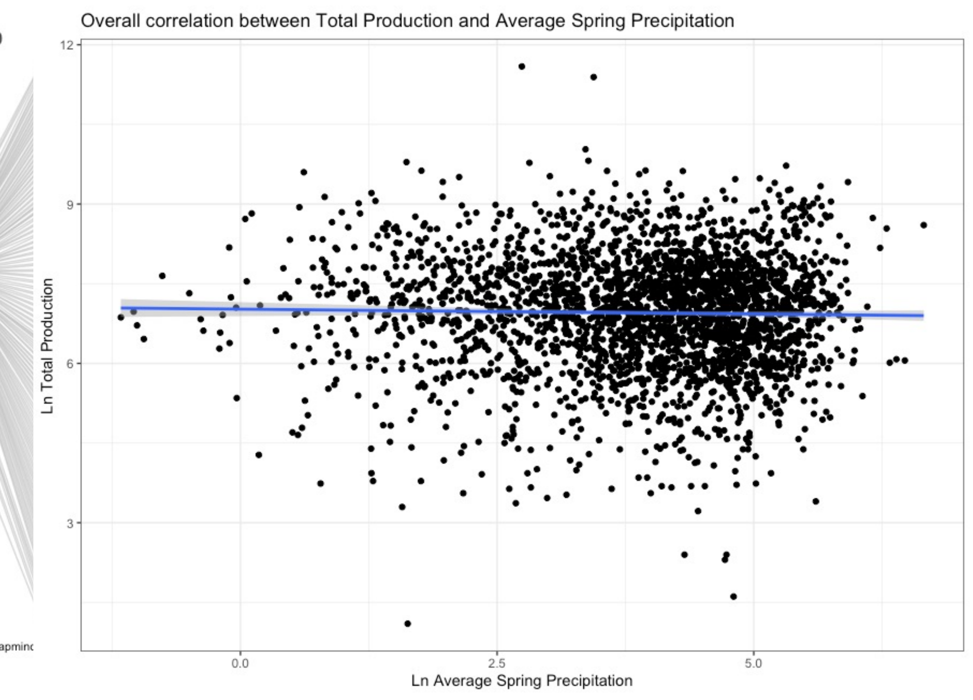
R_{sd} indicates the standard deviation of rainfall throughout the year, as a measure for rainfall variability to assess overall shocks in regional precipitation, considering that it can impact growing and non-growing season's production rate.

T_{avg} measures the average temperature for every month, where for different districts in China, or simply the north and south, it would have varying influences.

Results

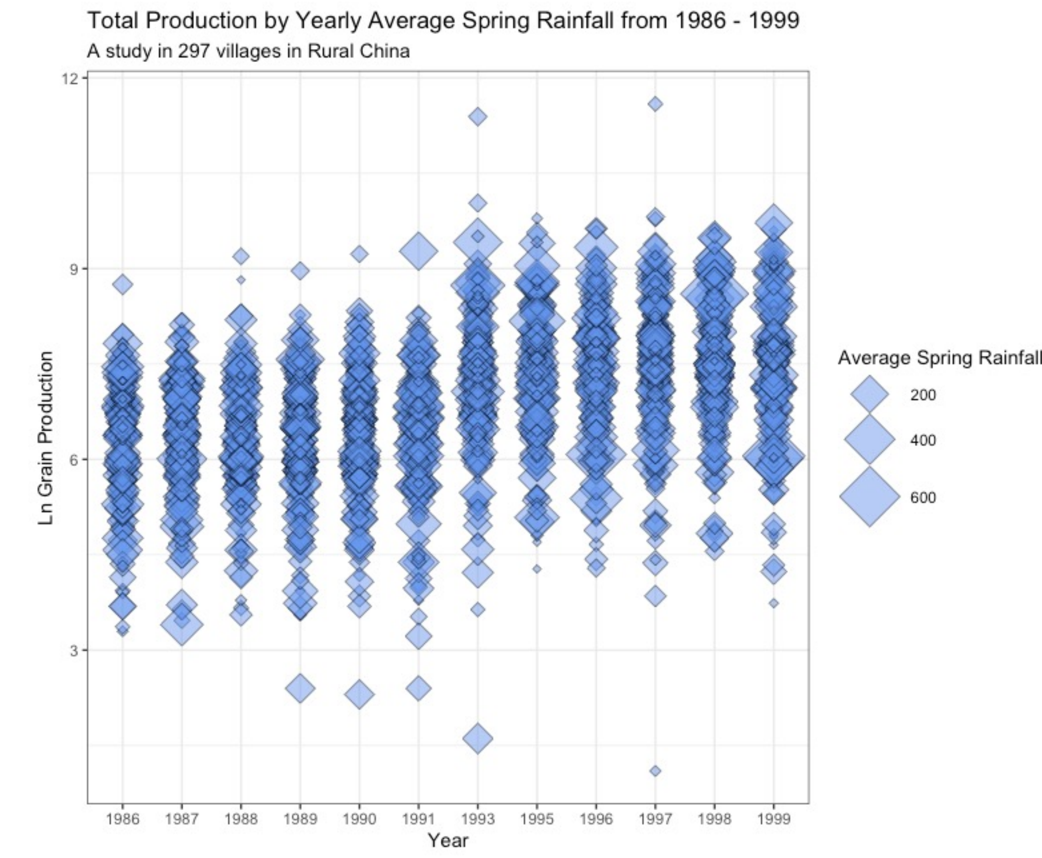
Within the 297 villages that locate across 23 provinces, we can see that their yearly production are mostly stable across 12 years, where presumably, those that rely more heavily on fishery or are not agriculturally diverse in planting, once occur weather shock would have greater fluctuations in production results. Seeing such variability leads us to further investigate in reasonings for agricultural shock.





Counterintuitively, the relationship between spring precipitation and total production is slightly negative, where one of the explanations is the variation in products themselves. Total production is a measurement that aggregated all the produce that the villagers farm, including grain, wheat, corn, soybean, tea, fruits, vegetable, and fish. All these produce may have varied prime growing seasons and require certain soil suitability which may relate to the land quality itself, where there is still a statistically significant coefficient for spring precipitation.

Potentially, such limitations can be solved if we can separate and categorize the different types of produce households farm, also gain data for soil suitability according to types of crops; Ideally, individual case studies for each household and their savings and income would be a better measurement for production, as the unit of a one village still includes too much heterogeneity.



Discussion & Conclusion

Based on the general linear model for testing the correlation between total production and weather variables, the standard deviation of rainfall throughout each year is positively and statistically significant with production, which also partially explains how spring precipitation was not the most accurate explanation for our total production variable. Unsurprisingly, monthly average temperature is slightly positively correlated with total production.

Total production is also positively correlated with revenue, which in conclusion, suggests that once a household experiences severe agricultural shock, especially continuously for multiple years, their income drops and can be quantified as one of the reasonings for migration.

	Dependent variable:
	lngrains
ln_spring	-0.034**
	(0.016)
sd_precip	0.002***
	(0.001)
mean_airtemp	0.005
	(0.004)
Constant	6.837***
	(0.163)
Observations	2,803
R^2	0.004
Adjusted R^2	0.003
F Statistic	15.743***
Note:	*p<0.1; **p<0.05; ***p<0.01

	Dependent variable:
	revenue
lngrains	1,833.028***
	(301.819)
Constant	-9,208.528***
	(2,123.167)
Observations	2,801
R^2	0.013
Adjusted R^2	0.013
Residual Std. Error	17,403.080 (df = 2799)
F Statistic	36.884*** (df = 1; 2799)
Note:	*p<0.1; **p<0.05; ***p<0.01

$$Y_{lntotalproduction} = a_0 + a_1 R_{lnspring} + a_2 R_{sd} + a_3 T_{avg} + e_i$$

$$Y_{totalrevenue} = b_0 + b_1 X_{lntotalproduction} + e_i$$

Table: The Correlation between total production and spring precipitation utilized a fixed effects model, while assessing the relationship between total revenue and total production, a linear regression model was utilized.

References

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