PROJECT PROPOSAL TO REQUEST ARMS ACCESS

1. Project Title

Measuring the value of crop insurance and other conditional agricultural income support to US farmers

2. Personnel and Contact

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3. Project Description

(1) Main objective

The principal objective of the project is to measure the value of crop insurance and other conditional agricultural income support to agricultural producers in the US. A secondary (and supporting) objective involves the construction of a "quasi-panel" dataset of farm-households, with longitudinal data on farm income and farm-household expenditures.

(2) Recent federal programs and literature

A rapidly expanding set of federal programs transfers resources to US farmers. Crop insurance is supposed to compensate farmers for production shortfalls or drops in prices; the current administration's Market Facilitation Program (MFP) is meant to compensate farmers for losses due to recently imposed restrictions on trade; the "Coronavirus Food Assistance Program" (CFAP) and other legislation currently proposed is supposed to support farmers in the face of losses caused by Covid-19 and its disruptions to the supply chain.

The scale of recent support and proposed transfers is huge. "Baseline" federal support for agriculture in 2018 was roughly $8.75 billion. MFP was introduced only in late 2018; expenditures under this program have been roughly $14.5 billion to date. The just introduced CFAP program is a roughly $19 billion program, of which about $16 billion is to be given directly to producers. Additional legislation to deal with the fall-out of the Covid-19 crisis is likely to lead to further transfers. These programs will more than double federal support to US agriculture in 2019–20.

Crop insurance and other federal supported payments in the US are supposed to reduce the risk faced by farmers, and so improve their welfare. There are compelling theoretical reasons to think that this should be so, but there have been no real attempts to actually measure the reduction in risk or changes in welfare. This means that one can't directly evaluate how these programs are performing relative to their stated aims. And without some measurement of salient outcomes, one may not be able to identify the strongest-performing programs, detect poorly designed programs or insurance policies, or to devise improvements.

. *Date*: January 5, 2021.

This project seeks to measure risk and welfare impacts of crop insurance and other conditional agricultural income support in the US. A recent paper (Carter, Dong, and Steinbach 2020) finds that the MFP did not fully compensate many California farmers for losses attributable to the 2018 Trade War with China. Additional work by Carter seeks to understand which types of US farmers benefited most from trade aid cash transfers which were created in response to retaliatory tariffs imposed during the 2018 Trade War. Our project will contribute to this literature by measuring the value of crop insurance and other conditional agricultural income support programs to agricultural producers in the US. We will answer questions about which transfers a producer of a given type can receive, what proportion of transfers go to producers at different points in the income or expenditure distribution; etc. In classifying types of farmers, we will only use data from regions and years where enough farms are observed in the ARMS data to prevent the compromise of confidentiality.

Furthermore, while the direct costs of providing subsidized crop insurance are well understood, and the impact of these programs on production have been estimated for California producers, no one has constructed estimates of the value of risk reduction from crop insurance, either for the US or for California. The rationale for providing crop insurance and other conditional support rests on the view that there's value in reducing the economic risk faced by farmers, and that this risk depends on variation in yields, prices, or revenue. And so measuring the value of the programs rests on measuring both the risk farmers bear as well as the reduction in risk delivered by crop insurance.

(3) Our approach

Standard approaches to measuring economic risk for individuals or households rely on repeated observation of some measure of non-durable consumption expenditures. Such data is widely collected from farm-households in many low income countries, but has not been systematically collected from farms in the US until very recently (the Agricultural Resource Management Survey [ARMS] began collecting some data on such expenditures in 2006). The Consumer Expenditure Survey collects very detailed data on household expenditures, but (as it's meant to be representative of the US population) only about 1% of its sample are farmers.

Our approach to estimating the risk-reduction due to federal crop insurance and other conditional agricultural income support programs necessarily begins by constructing a dataset with data on (farm-) household expenditures, farm income, and indemnities from federal crop insurance programs. All of these data are available in ARMS, but ARMS is designed to yield repeated, representative cross-sections of US farms, not the panel data needed to understand or measure changes in risk borne by a particular household. We propose to address this problem by constructing a "quasi-panel" of farms within particular regions or states (which of these is chosen will depend on the population and size of sample within the geographic region) growing a particular crop. Thus, for example, we'd construct something like a representative farm-household constructed from statistics of the distribution of household-level expenditures for tomato growers in California. The "area probability" sample of ARMS should allow us to deal with issues related to the entry and exit of tomato growers in the region.

With these data in hand, we can use methods described by Ligon 2019 to estimate farmers' intertemporal marginal rate of substitution for each year 2006-2019 (or the most recent available), and see how this is related to indemnity payments from crop insurance - if insurance is working as it should, we should see that farmers with insured crops have a lower correlation between expenditures and income than do uninsured farmers. We can also think of crop insurance as an asset. Once we do this, we can use tools from finance to measure both any excess returns ("alpha") associated with crop insurance, and also its value in insuring otherwise uninsured sources of risk ("beta"), ultimately backing out estimates of the benefits of crop insurance to farmers in terms of certainty-equivalent consumption expenditures.

Federally subsidized crop insurance and other conditional agricultural income support programs have been rapidly expanding in recent months. But though the costs of such programs are well-measured, the benefits are not.

4. Data request

For this project we request ARMS Phase III data from 2006 to the most recent available year. The final data product will be a region-crop-year-level pseudo-panel; regions will be defined so that confidentiality is not compromised (e.g., if there are very few ginseng producers in California, then the region would be bigger than the state). This will involve the release of data from states/regions in years where enough farms are observed in the ARMS data to prevent the compromise of confidentiality.

5. References

Carter, Colin A., Jiayi Dong, and Sandro Steinbach. 2020. 2018 trade war, mitigation payments, and California agriculture. *ARE Update* 24 (2): 1–4. `https://giannini.ucop.edu/filer/file/1607970056/19926/`.

Ligon, Ethan. 2019. Estimating household welfare from disaggregate expenditures. Unpublished manuscript. `https://escholarship.org/uc/item/3ts0g5tn`.