Farmer Suicide and Mental Health and the Role of Socio-Economic Factors, Climate and Policy Changes, and Rural Mental Health Infrastructure

Grant proposal submitted to SCAHIP Pilot Studies Program

September 13, 2018

Principal Investigator:
Prof. Valentina Hartarska, Alumni Professor, Department of Agricultural Economics and Rural Sociology, Department of Finance, Auburn University, email: hartarska@auburn.edu

Co-Principal Investigator:
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Abstract
The United States Department of Agriculture (USDA) estimated that the net income of farmers has decreased by 50% since 2013 and it may remain at the lowest level until the end of the 2018. According to the latest available Agricultural Census data, in 2012, over two thirds of farmers were 55 years or older and over half were in retirement age. Farmers’ advanced age, coupled with prolonged time of lower incomes are likely to affect farmers’ mental health. In 2016, the CDC estimated that suicide rates among “farming, fishing, and forestry” occupational groups are significantly higher than in any other occupation.\(^1\) We propose to evaluate what factors and to what degree have contributed to the higher suicide rates and mental health problems of farmers’ and workers in farming, fishing, and forestry.

Specifically, we will investigate how demographic factors, commodity and inputs price variability, policy induced change, and climate variability, affect farmers’ mental health and suicide. Following previous works in the Southeast highlighting the importance of availability of mental health support, the proposed research will incorporate the availability of and the extent to which existing mental health support infrastructure in rural areas is helpful in countervailing some of the economic pressures that farmers face.

Specific objectives of the project are:
1. Identify the specific demographic, climate, market volatility, and policy changes that serve as external stressors and affect farm workers’ suicide and accidental death from on-farm injury (a proxy for mental stress). Estimate their marginal impact.
2. Identify if and how accessibility of mental health support infrastructure helps farm workers’ mental treatment and thus prevents suicide and deaths.
3. Estimate differences in suicide rates and their seasonal variability between the five southern states and other states.
4. Use the results and accumulated data to motivate larger grant application

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\(^1\) While the CDC later withdrew their study and is recalculating these rates, a careful reading of the correction notice suggests that the overestimation is likely very small, if any. The first reason is that adding to the rate denominator the farmers-managers, which were accidentally excluded because farmers were classified as managers and not workers, does not change the rate much as there are not that many full-time farmers. The second reason why on-farm suicide rates are likely still high is because many farmers’ deaths are misreported as accidents, thus leading to the undervaluing of the nominator of the ratio.
Anticipated outcomes include a journal article, a dataset, and an impact analysis methodology, which can be used to motivate a larger research proposal that would bring attention to the topic within the NIH, USDA, and other granting agencies. We will provide the marginal value of the impact of various socio-economic, policy, and climatic factors on farmer suicide that can be useful for designing better policies and mental health interventions and suicide prevention.

Project Overview and Significance

The United States Department of Agriculture (USDA) estimated that the net income of farmers has decreased by 50% since 2013 and it may remain at the lowest level until the end of the 2018. According to the latest available Agricultural Census data, in 2012, over two thirds of farmers were 55 years or older and over half were in retirement age. Farmers’ advanced age, coupled with prolonged time of lower incomes are likely to affect farmers’ mental health. In 2016, the CDC estimated that suicide rates among “farming, fishing, and forestry” occupational groups are significantly higher than in any other occupation. We propose to evaluate what factors and to what degree have contributed the higher suicides and mental health problems of farmers’ and workers in farming, fishing, and forestry.

Research from Australia and Scotland has found that occupation related anxiety and depression explains why farmers have higher suicide rates relative to other occupational groups (Stark et al, 2006; Judd et al, 2006). Previous work on farmers’ mental health in the Southeast suggests that climate variability related harvesting problems, long working hours, and limited accessibility to mental health support mechanisms increase the mental health problems among farmers and farm workers (Browning, Westneat, & McKnight, 2008). We believe that factors putting pressure on US farmers are specific and identifiable. First, increase in extreme weather is associated with higher incidences, and more severe realizations, of draughts and floods, which affect farmers’ incomes (Hartarska et al., 2016 & 2017). Second, policy induced changes from the last Farm Bill left farmers with fewer government support mechanisms, while the increased climate variability increases output price fluctuations. In collaborative research, the PI has shown that farmers responded by changing the hours they work and by exiting farming (Le et al., 2017; Griffin et al., 2018).

The main hypothesis of the proposed work is to test and identify to what degree each of these pressures are causing higher suicides currently observed. Specifically, we will investigate how demographic factors, commodity and input market variability, policy induced change, and climate variability affect farmers mental health and suicide. Following older work on the Southeast highlighting the importance of availability of mental health support, the proposed research will incorporate the availability of and the extent to which existing mental health support infrastructure in rural areas is helpful in countervailing some of the pressures that farmers face. This is very important because the co-PI’s dissertation research found that support mechanisms have a differential effect in rural and urban areas. The focus of this research will be on all the southern states for which suicide data is available - Georgia, Kentucky, North Carolina, South Carolina, and Virginia. In addition, we will conduct comparisons with the other 12 states for which recent data are available.
Specific Aims

1. **Identify the specific demographic, climate, market, and policy changes that serve as external stressors and affect farm workers’ suicide and accidental death from on-farm injury (a proxy for mental stress). Estimate their marginal impact.**

   This would entail developing appropriate impact analysis methodology, such as panel fixed effects models that can be used with panel county or a zip code level dataset that we will assemble. The dataset will contain measures of climate variation, profitability and variability of profits in agriculture, commodity price volatility, measures of available financial resources and government supports (e.g., changes between the last two Farm Bills), and of accessibility of the mental health support mechanisms (see Aim 2).

2. **Identify if and how accessibility of mental health support infrastructure helps farm workers’ mental treatment and thus prevents suicide and deaths.**

   To develop the best methodology and consider all relevant variables (e.g., which factors may contribute to farmer mental illness), we will interview and work collaboratively with the director of Gulf States Health Policy Center/Bayou Clinic to identify psychological stress factors that might contribute to farmers’ mental illness.

3. **Estimate differences in suicide rates and their determinants between seasons, among the five southern states, and between the southern other states.**

   Separate regression models of determinants of suicides and of accidents by season as well by Southern and Northern regions. Data are available for five southern states (Georgia, Kentucky, North Carolina, South Carolina, and Virginia) and for four northern states (Maryland, Massachusetts, New Jersey, and Wisconsin), as well as few other states. Previous work has not looked at dereferences across regions but the Co-PI’s dissertation results imply that, besides differences along the rural–urban divide, there are mental health related differences among regions that may also be seasonal.

4. **Use results and accumulated data to motivate larger grant application**

   The last goal is to use the empirical results and, within a larger grant proposal, to bring attention of the NIH and USDA to the issue of mental health challenges faced by farm operators and workers in farming, fishing, and forestry occupations.
Anticipated Outcomes

1. At least one journal article published in a SSCI academic journal

2. An impact analysis methodology specifically adapted to farmer suicide and mental health issues related to the specific factors listed above and appropriate to use with existing panel on zip code or county level data

3. Dataset that will be made available to other researchers

4. Project used as a starting point to develop bigger research proposals to submit to the NIH and USDA grant programs focusing on small farms

In terms of specific results, we will not only identify the economic, climatic, policy, and rural infrastructure factors that affect farmer suicide and possibly other measures of mental health but we will also estimate the marginal impacts of each of these factors. We anticipate that we will have a sense of whether on-farm accidental deaths are affected by various stressors and whether there is seasonality in deaths related to the seasonality of stressors. We also anticipate that we would either use the corrected farmer suicide rate data from the new CDC statistics or we could correctly compute these rates using the farming, fishing, and forestry occupation, as well as farmer-managers data.

Research Plan

1. Review the existing literature to understand the factors that affect suicides.

2. Interview the director of the Gulf States Health Policy Center / Bayou Clinic Mrs. Emily Blejwas to identify what additional psychological factors contribute to increased suicide death rates for farmers and identify other factors affecting mental health.

3. Data analysis: Assemble data with special attention paid to choosing the best unit of observation. Develop an appropriate research methodology, specify and estimate the empirical models. County level data on suicide or accident related deaths will be obtained from the National Center for Health Statistics for the period 2012 to 2017. Then, suicide rates among farmers and farm workers will be identified by using occupation codes. To measure the role of accessibility of the mental health support mechanisms, the number of mental health providers in each county from the National Plan and Provider Enumeration System (NPPES) and National Provider will also be used.
11 Month Timeline (October 1, 2018 – September 30, 2019)

- **October 2018 – November 2018:** Conceptualizing the project
  Collaboration with the Gulf States Health Policy Center / Bayou Clinic to develop appropriate measures of mental health infrastructure support variables and identify factors that affect specific mental health challenges faced by farm operators and workers in farming, fishing, and forestry occupations.

- **November 2018 – January 2019:** Dataset assembly, compilation, tabulation, and data description.
  County level and/or zip code data from the National Center for Health Statistics, the Census Bureau, the National Provider Identification (NPI), the National Plan and Provider Enumeration System (NPPES) and some other sources.
  Merging the data from different sources by FIPS codes.

- **January 2019 – March 2019:** Developing the best and most appropriate methodology on the data structure and literature. Subsequent empirical model estimation.

- **April 2019 – June 2019:** Writing the research report and journal article submission for publication. Presentation of the results at an appropriate conference.
  Completing a full draft for revision and writing an abstract.

- **July 2019 – September 2019:** Submission of the report and journal article for review and publication.
**Detailed Budget Plan**

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<th>Direct Costs</th>
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<td>Salaries (3.05%)</td>
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<td>Travel*</td>
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<td>(presentation, publication and data collection costs)</td>
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Subtotal                                             $ 9,576.50

IDC at 26%                                           $ 2,489.89

Total                                                $ 12,066.39

*Travel is to the Gulf States Health Policy Center/Bayou Clinic for help in developing concepts and to a scientific conference (includes registration fees and accommodation) to present the research results. Data access fees are envisaged in this budget.
Cited Work:


Griffin,* Bretford, Nadolnyak, and V Hartarska, “Retirement Age Farmers Exit and Disinvestment,” under review in *Journal of Agricultural and Resource Economics*


Attachments
Bio Sketch Hartarska (PI)

Valentina M. Hartarska, Alumni Professor & GPO
Global Teaching Academy Fellow
Department of Ag. Economics & Rural Sociology
Department of Finance
Auburn University
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Auburn, AL 36849
Phone: 334-844-5666
Email: hartarska@auburn.edu
Google Scholar link

The PI is an agricultural economist and holds the university title of Alumni Professor. Dr. Hartarska’s areas of specialization are impact analysis methods and applications, agricultural economics, economic development, and finance. She teaches undergraduate Agribusiness Finance and doctoral level Impact Analysis courses. She has supervised over 20 doctoral and MS theses.

While the PI has worked outside of the health economics field, several of her research projects are relevant for this proposal. In an undergoing project, she applies rigorous econometrics methods to secondary survey data on children malnutrition in Ethiopia to establish whether parents discriminate against baby girls. Dr. Hartarska has just published an article in Food Policy (highest impact factor journal in agricultural economics) where she estimates the causal impact of adopting the HACCP (hazard analysis critical control point - a type of food production processes safety rules) for seafood production processes on seafood important in the US. Related to this proposal is the PIs recent work that establishes how fluctuations in commodity and financial markets, declines in government support for farmers, and climate variability and change affect farmers’ incomes and exit from farming. The PI also recently published a journal article linking climate variability to farmers’ on-farm work.

Finally, the PI is the dissertation advisor for Suzan Odabasi, a doctoral student and a co-PI on this proposal who will carry out most of this project. The co-PI’s dissertation focuses on how mental health affects crime in rural and urban areas. As part of her dissertation, Ms Odabasi has assembled and analyzed data similar to the data needed for this project. That is why the PI, Dr. Hartarska, is confident that the results from this exploratory research will help develop a larger NIH or NIFA (USDA) grant that would bring the attention to the farmers’ and agricultural workers mental health problems. In addition, the PI is confident that the research will result in at least one journal article published in a high quality academic journal.
Biographical Sketch of Suzan Odabasi Co-PI

A fourth year doctoral student in Applied Economics Auburn University, Suzan Odabasi’s research interests are in health economics and economics of crime. She received her master’s degree from the Middle Tennessee State University. During her Master’s studies, she worked at the Business and Economic Research Center at Middle Tennessee State University. In the project titled “Health Care Industry Nashville MSA 2015: Trends, Scope, and Impact on the Regional Economy”, she worked as a research associate. Her responsibility was obtaining primary and secondary data, analyzing the statistics, and reporting them for the final output.

Her dissertation is focused on the economics of mental health and crime in urban and rural areas in the U.S. Part of the work is awarded the best poster award at the 74th Professional Agricultural Workers Conference. The results from her ongoing research provide insights into differences in effectiveness of mental health prevention in rural and urban counties.
12 September 2018

Dear Committee:

I am happy to be able to write this letter supporting Suzan Odabasi. Suzan took my graduate course in international trade theory last spring at Auburn. I was impressed with her grasp of the material. Her term project is interesting and displays good grasp of a detailed data set.

Suzan’s background and experience make her especially qualified as a high level researcher. I would trust her to complete the project on farmer suicide rates with competence and sophistication. Her common sense on economic issues comes across in presentations and discussions.

The opportunity for Suzan to work together with Valentina Hartarska on the project will benefit both. Professor Hartarska is a serious, successful researcher with a fine publication record. She put in a lot of effort on our joint paper in *Applied Econometrics and International Development* (2007) on foreign investment and growth in Central and Eastern Europe. The empirical analysis in that paper, due entirely to Valentina, is excellent.

Suzan is always ready to discuss economics. On a personal level, she is very thoughtful. She impresses in person, coming across as intelligent and connected. On a number of levels, I am happy to recommend Suzan Odabasi.

Yours truly,

Henry Thompson
Emeritus Professor of Economics
Project Title
socio-economic factors affecting farmers’ mental health and suicide

Co-Principal Investigators
Preparer's Name: Patrick Huddleston
Preparer's Email: huddlpj@auburn.edu

Type of Project/Activity
Research

Subcontracts?
NO

Strategic Initiatives and Special Programs

Budget Summary

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Commitment of University Facilities

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Compliance

Radiation Safety (RSC)
Does this project include the use of ionizing radiation including the use of radiation generating equipment (e.g. x-rays, lasers, magnetic devices, and equipment containing radioactive materials such as gas chromatographers, liquid scintillation counters, density gauges, etc)?
NO

Human Subjects Research (IRB)
Does this project include the use of Human Subjects?
YES

IRB Protocol #:
IRB Expiration Date:
IRB# justification:

PHS / PHS Flow Through Conflict of Interest
PHS / PHS Flow Through / PHS Adopter?
NO

Biological Safety (IBC)
Does this project include the use of recombinant or synthetic nucleic acid molecules or other biological agents including bacteria, viruses, toxins, blood borne pathogens?
NO

Vertebrate Animals (IACUC)
Does this project include the use of live vertebrate animals or specimens?
NO

NSF / NSF Flow Through Conflict of Interest
NSF or NSF Flow Through?
NO
FDA Compliance - GXP Requirements
Good Clinical Practice?
NO
Good Laboratory Practice?
NO
Good Manufacturing Practice?
NO
Other GXP Requirement:

EPA Compliance
Good Laboratory Practice?
NO
Other EPA Requirement:

FDA Compliance - Other
Investigational New Drug Application?
NO
Investigational New Animal Drug?
NO
Other FDA Requirement:

RCR Training - Responsible Conduct of Research (RCR)
The National Science Foundation (NSF) and USDA National Institute of Food and Agriculture (NIFA) have specific requirements in regard to training and oversight in the responsible conduct of research (RCR). Please note that these requirements will need to be met in accordance with any resultant awards from these agencies. The following link provides more detailed information on this topic: Information on RCR

Field of Science
Field of Science
Special Review Checklist/Comments
Special Review Checklist
Project classified?
NO
Controlled Unclassified Information?
NO
Project subject to ITAR/EAR?
NO
Technical Data Or Computer Software Restrictions?
NO
Proprietary information, to AU or the Sponsor, involved?
NO
Restrictions On University/Investigator Publication Or Intellectual Property Rights?
NO
Commitment of University/Investigator Intellectual Property or "Background" Rights?
NO
Contractual Terms And Conditions Included In Solicitation?
NO
Project Involves Substantial International Activity?
NO
Safeguarding Covered Defense Information and Cyber Incident Reporting (DFARS 252.204-7012)?
NO

Attached Documents
general - AttachmentsHO.pdf
general - 09-12-18 14:01:37
general - HUDDLPJ
general - 5 proposal_Hartarska_and_Obadaci.pdf
general - 09-12-18 14:01:44
general - HUDDLPJ
general - 7 SCAHIP_Pilot_Announcement2018.pdf
general - 09-10-18 14:54:46
general - HUDDLPJ
general - 2

Approver's Comments
rejected - Patrick Huddleston [prep] - 09/12/2018 01:59 PM - Return to add documents
rejected - Patrick Huddleston [prep] - 09/12/2018 02:36 PM - Return to change approval order
rejected - Patrick Huddleston [prep] - 09/12/2018 02:15 PM - Return to delete three documents per Dr. Hartarska's request
approved - Valentina Hartarska [PI] - 09/12/2018 02:26 PM - OK my email in incorrectly typed. It is hartavm@auburn.edu or hartarska@auburn.edu but not hartaym
approved - Patricia Duffy [HEAD-120150] - 09/12/2018 02:46 PM - OK
approved - Henry Fadamiro [ADR-120150] - 09/13/2018 08:15 AM - Approved
approved - Juanita Winegar [SUPF-120150] - 09/14/2018 08:58 AM - Approved - JMW