

Summer Research Fellowship Proposal

Created Monday, March 02, 2015

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Summer Research Fellowship Proposal (no more than 4-pages double-spaced = 1,200 words in length).

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A **Proposal** For:

Disasters in Wisconsin: An Examination of Mitigation Investments' Effect on Damages

By Student with the supervision of Prof. X, PhD

My desire to engage in original research began last summer while considering the environmental trade-offs between print- and

digital-based media. After taking Intermediate Microeconomics with Professor X in Fall Semester 2014, I was reminded of these trade-offs and approached him about the topic. These discussions ultimately lead to my desire to work on research and a SURF project investigating these trade-offs on an issue important to the state of Wisconsin.

The idea grew out of recent work Dr. X was doing with another Economics Major. Through an Undergraduate Research Project, student S examined the return on investment for flood disaster mitigation spending in the U.S. relative to the ex-post damages ultimately experienced. This URP resulted in the creation of a database containing county-level socio-demographic characteristics, national investments in flood mitigation and disaster damages from storms and flooding over the past 30 years. The results of the project indicate that every \$1 spent on mitigation results in \$33 of avoided damages during future flood events during the first year of implementation. The benefits from mitigation were found to decrease over time, but at a decreasing rate, leveling off at around \$24 for every \$1 spent after 6 years. This highlights the fact that investments in mitigation can have long lived impacts and their importance in protecting lives and property. I was interesting in expanding on this analysis and focusing specifically on the state of Wisconsin, which may differ from the rest of the U.S. in significant ways..

The topic can be motivated by the fact that over the past two decades, concern over storm intensity, frequency and predictability has grown significantly because of climate change. Examples of large scale national disasters such as Hurricanes Katrina, Rita, and Sandy have increased the importance of understanding the role mitigation investment can play in dealing with increased storm activity and intensity. Katrina, Rita, and Sandy are all prominent examples highlighting the importance of not only appropriately understanding

Reviewer 2: I suggest creating sections for this proposal: Introduction; Methods; Anticipated Results; Conclusion. It will help in the organization of material. The proposal was not very well organized.

Reviewer 1: I did not see where to focus is being addressed in what you described as your project's steps

Reviewer 2: This is a rambling combination of sentences. It does not set the stage for the proposal.

Reviewer 4: The paragraph seems unclear, especially given it begins by discussing print/digital media trade-offs, suggests X was approached regarding those, and then shifts to a completely different topic....At best, unclear as an opening.

Reviewer 3: This paragraph helps to explain why the student is prepared to take on the project, and how the project would benefit the student.

Reviewer 3: This information helps to explain why the proposed project is the next logical step to take in researching this topic.

Reviewer 3: This conclusion has broad importance and helps to make the case for why the research project should be funded.

Reviewer 3: Research is always building on previous knowledge, so it is good to mention how the proposed project will connect to what is already known.

Reviewer 4: Better to begin the proposal with an altered version of this paragraph and be directly "on topic" from the start....Like to see some sourcing in this opening paragraph as well.

Reviewer 2: Explicitly state what topic you are talking about.

Reviewer 1: Do you mean "motivating"?

Reviewer 1: It might help if you briefly explained what mitigation investment was as not everyone reading this will be as familiar with economic terms as you are.

disaster risk, but also having a set of policies and programs in place to mitigate the damages associated with that risk well before an event occurs. **Mitigation programs create the opportunity to significantly increase social welfare through avoided future costs that would otherwise occur in the event of a natural disaster. Damages and costs incurred in the aftermath of these storms have been estimated into the tens of billions of dollars.**

Reviewer 3: This sentence helps to define the focus of the research project. It briefly defines mitigation and points out the basic benefits thereof.

Reviewer 2: Need citation.

The types of impacts experienced from climate change and storm risk are not limited to coastal areas in the United States though. **Here in Wisconsin, storm frequency and intensity are also changing.** The continuing shift in weather and climate patterns increases the likelihood of occurrence for **coastal storms in Wisconsin.** **Without appropriate planning and programs in place to mitigate Wisconsin's coastal storm disaster risk, these potential threats will significantly impact Wisconsin through agricultural and economic production losses, property damages (particularly in unplanned or poorly planned developments), as well as through the destruction of fragile, natural ecosystems. Additional health problems are also likely to result from storm water management issues that result in sewer backups and overflows. Of particular importance are impacts on storm water management and erosion control from changing storm patterns and the associated property and environmental damage that may occur..**

Reviewer 3: This paragraph transitions nicely from a nationwide problem, with nationwide data, toward the specific focus of the proposed project, which is Wisconsin.

Reviewer 1: I am not sure what "coastal storms" would occur in Wisconsin. Do you mean residual effects from coastal storms?

Reviewer 2: Needs citation.

Reviewer 2: It is not apparent what you are talking about here. Is the disaster risk increased precipitation, tornadoes, etc. Needs to be explicitly stated.

Reviewer 2: Needs citation. At this point I would argue that not having citations negatively impacts your proposal.

Reviewer 2: Where is your evidence.....Citation needed.

Reviewer 3: These sentences also underscore the importance of the proposed study, in terms of the monetary value and other potential effects.

Reviewer 4: Statements in the last two paragraphs need to be sourced and, in so doing, will most likely become more specific.

Reviewer 4: Like to see a clear statement of purpose prior to presentation of various steps involved in the project itself.....

Reviewer 2: What damage types? State them.

Reviewer 3: This is helpful, to break down the project into manageable chunks. It also helps the grant reviewers to picture the project happening, which might make them more likely to approve the proposal.

In order to determine how much investment Wisconsin should make to help combat these types of damages, a thorough examination of the benefits mitigation offers must be performed. **The first stage of my SURF project therefore, involves quantifying the flood mitigation investment benefits for the state of Wisconsin. In order to accomplish this, I will begin by reviewing the literature on disaster mitigation investment specifically related to storms and floods. I will then build off of the database constructed by student S and Dr. X. This database contains national level measurements on investments in mitigation projects and/or programs. A current limitation of the database is that it misses out on state, county, and/or local investments in mitigation spending which may be substantial. It is important to take account of these mitigation expenditures in order to accurately quantify mitigation's true impact reducing disaster damages. To augment the database, I will spend a week over the summer contacting state and local organizations which are involved in disaster risk planning in Wisconsin. In addition, to learn about the current state-of-practice regarding disaster planning, I will also investigate potential sources of data containing information on state-level spending on mitigation investment.**

Reviewer 1: I am not sure what mitigation spending is. It would help if you briefly clarified what this is.

Reviewer 2: I don't understand this sentence. Am I correct in assuming that the model in existence only covers federal dollars and not state, local and county dollars.

Reviewer 2: How will you investigate?

The second stage of my SURF project involves obtaining either digital sources of Wisconsin's investments in mitigation or **obtaining hard copies and coding them into Excel.** It will also involve incorporating measures of income for each county in the state of Wisconsin (a variable also currently lacking in the larger database but important to include in any modeling application). After the data is in electronic format, I will amend the previous database with the Wisconsin specific mitigation and **income information.** This subset of the data can then be analyzed to determine the efficiency of Wisconsin investment in mitigation spending.

Reviewer 2: Where are you going to get these?

Reviewer 1: What income information would be involved in this?

The final stage of my SURF project will involve **modeling** the impact of mitigation spending in Wisconsin on disaster damages experienced. This will not only involve determining the dollar value of mitigation spending on avoided damages, but also an

Reviewer 2: What model will you be using? Do you have access to the best model?

exploration (with the included income data) of whether economically disadvantaged communities are at greater risk of experiencing disaster damages. Ultimately, the results of these models will be written up in a policy bulletin to be made available to Wisconsin lawmakers, as well as a peer-reviewed journal article submitted to Disasters or Journal of Environmental Management.

Reviewer 2: These are your methods. Create a methods section.

Reviewer 2: I have concerns that this will be attainable in 10 weeks.

This project will be beneficial to a number of groups across Wisconsin. First, it will benefit the policy-makers making decisions over investment in mitigation. By determining the return on investment in mitigation, state and local lawmakers will be better informed regarding the costs and benefits of mitigation spending, leading them to invest scarce state resources more wisely. Second, local non-profit, community and business groups will be better informed regarding the benefits of mitigation and may undertake projects even without public resources.

Reviewer 3: This is helpful, to show that the proposed project will benefit people outside the University.

I am currently, a junior majoring in Economics. I recently finished my theoretical training in microeconomics and will be taking econometrics next fall. I believe this SURF project will help me develop skills in data collection and econometric model building, which I would not otherwise have an opportunity to learn. These skillsets will be important in both my application to graduate school, as well as my future career, where I hope to make a positive change in the world of economic policy.

Reviewer 2: Did not address how this research will be continued over the next academic year. This should be spelled out.

Reviewer 2: Excellent

Reviewers 3 and 4: This information also helps to explain how the project will benefit the student, which is an important goal of the Undergraduate Research Program.

For this project, I will be supervised by Prof. X, PhD. He is an Assistant Professor in Economics with a specialty in natural resource and environmental economics. Professor X is very enthusiastic about working on this project and having the chance to continue working in this area, particularly with a specific application to Wisconsin. He believes this SURF project provides a unique opportunity to both inform the policy community in Wisconsin about this issue as well as publish in peer-reviewed journal outlets.

Reviewer 4: Probably don't need to provide background on Prof. X or his background.....

Reviewer 4: Overall, a solid project with some minor issues in presentation, focus, and conciseness. Avoid first-person writing when possible; eliminate minor style errors.

Literature Citations - ONLY Bibliographies

Reviewer 2: There should have been paper cited in this proposal.

(No response)

This section is ONLY if you have Graphic Material

Applicants may upload one additional file containing an image, graphic, and/or diagram germane to the proposal. Applicants are encouraged to label their image, graphic, and/or diagram in the file upload as well as the narrative text in order to facilitate review. This is an optional attachment and not required for proposal submission.

Applicants may not upload any other file nor may applicants use this upload feature for additional text/information related to the proposal narrative. Files uploaded that include additional text as part of the narrative will not be forwarded to the reviewers.

GRAPHIC MATERIAL ONLY!

Please follow above instructions of this section.

(No response)

Timetable

Reviewer 2: Detailed and doable.

May 18th-May 24th: Review current literature on storm-related disaster mitigation strategies in Wisconsin (provided by Dr. [REDACTED]) and find relevant Wisconsin agencies which

Reviewer 1: Reviewing current literature might take longer than this.

- administer/implement disaster mitigation programs/projects.
- May 25th-May 31st: Contact Wisconsin agencies which fund or administer disaster mitigation programs and projects. Determine suite of Wisconsin specific strategies employed to mitigate the risk and harm associated with storm (flood) related disasters.
- June 1st-June 14th: Locate relevant county-level datasets pertaining to implementation of Wisconsin disaster mitigation projects over the past 30 years. This will be done through extensive digital (web) searches, as well as in consultation with agency contacts identified during the previous week.
- June 15th-June 30th: Data collected during weeks 3 & 4 will be amended to a database on national mitigation investments and disaster costs maintained by Dr. [REDACTED]. This database was started during a previous Undergraduate Research Project by [REDACTED]. If the data on Wisconsin level mitigation investment is not in digital format (i.e. is paper-based only) this time period may also involve data-coding.
- July 1st-August 1st: State level models examining the impact disaster mitigation spending has on ex-post disaster damages in the state of Wisconsin will be run using the data acquired in weeks 5 & 6.
- Fall Semester 2015: While taking ECON 345: Econometrics, additional more complicated modeling forms will be explored for the data. In addition, a draft paper detailing the results found regarding Wisconsin disaster mitigation investment will be written. Presentation of results at Undergraduate Research day at UW-Whitewater, as well as at the annual Wisconsin Economics Association conference held in Stevens Point (November 2015) are planned to showcase the research results.

KEY TERMS: economics, mitigation practices, natural disasters, disaster mitigation spending,