Professional Leave Report Cover Sheet

Name: Qin Fan

Department: Economics

College: Craig School of Business

Leave taken: X Sabbatical Difference in Pay Professional Leave without Pay

Time Period: X Fall

Spring

Academic Year

Other

Please upload your report to this DocuSign envelope. Your report will be sent to your Dean for your PAF and to the Library Archives. You will also receive a confirmation copy.

March 30, 2021

Dear Dr. Olson-Buchanan and Dr. Fu,

I am writing to report that I had a highly successful sabbatical leave over the Fall 2020 semester. The main goal of my sabbatical was, after all, to conduct a research project that examines flood mitigation and National Flood Insurance Program's (NFIP) community rating system (CRS), but ultimately, I also accomplished several other small goals. These include the following: I presented a paper at an international conference, revised and resubmitted five papers that result in three recent publications, and being invited to review articles submitted to the top peer reviewed journals.

Attached please find the following documents:

1. Reporting on the success of the leave.
2. Benefits to me as a faculty member.
3. Benefits to the university.
4. Copy of the original proposal.

Best,

Qin Fan

Associate Professor
Department of Economics
Craig School of Business
California State University, Fresno
Email : qfan@ssufresno.edu
Phone: 559-278-4931
Fax: 559-278-7234

Sabbatical Leave Report

By Qin Fan, Department of Economics, Craig School of Business, California State University, Fresno

Sabbatical semester: Fall 2020

Date of this Report: March 30, 2021

Reporting on the Success of the Sabbatical Leave

The main goal of my sabbatical leave in Fall 2020 is to conduct a research on flood mitigation and National Flood Insurance Program's (NFIP) community rating system (CRS), which is a voluntary program that recognizes and incentivizes community floodplain management practices that exceed the minimum requirement of NFIP. This work involves collaborative efforts across institutions. Although travel is restricted during the pandemic, I communicated regularly with a faculty member in Texas A&M, Galveston in virtual meetings. Following the research timeline proposed in the Sabbatical application, I accomplished all goals of the original proposal, which includes cleaning data, building the triple hurdle model, empirically estimating the model, testing robustness of the results, and working on the draft of the manuscript. What I did on my sabbatical is consistent with the activities proposed in the application.

As planned, the findings of the research were disseminated through an oral presentation at the 2020 North American Regional Science Council (NARSC), which is an annual international conference of the Regional Science Association. The conference was held virtually in November 9-13, 2020 and I presented the paper titled "Flood Risk and Floodplain Management Planning: Examining Factors Driving Community Rating System Participation" in the session "Natural Disasters: Planning and Recovery" where I was a chair and a discussant. The conference was instrumental. Constructive feedback on updating the CRS data using the most recent year data published by the Federal Emergency Management Agency (FEMA) will be incorporated in the project, which extends the original work.

Given the constructive feedback received from the international conference, my co-author and I continued this project by updating all the time-series data and re-estimating the model. As consequence of the leave's efforts and activities, I anticipate to complete the project and submit the manuscript to a peer reviewed journal in summer 2021.

In addition to the major goals accomplished, I also managed to revise and resubmit five manuscripts respectively to five peer reviewed journals including the top field journals such as *Land Economics* (ABDC rating-A journal) and *Climatic Change* (five year impact factor: 4.998). Three of the manuscripts were recently published in peer-reviewed journals *Applied Economics*, *Journal of Real Estate Research*, and *Journal of Education Finance*.

On my sabbatical, I was invited to review articles submitted to the top field journals including *Journal of Association of Environment and Resource Economists (JAERE)*, *Climatic Change*, and *Climate Change Economics*. All assignments were completed with high quality in a timely manner.

Benefits to Me as a Faculty Member

In terms of teaching, my virtual communications and collaborations with faculty members in different institutions allow me to compare the approaches and share ideas especially on teaching economic concepts to diverse student population, which helps improve advanced methods of teaching. My participation in conference sessions where students also presented their work provides opportunity for me to hear feedback from motivated students, which is instrumental for student advising regarding student research and presentation opportunities.

While the sabbatical involves multiple research/creative activities, two stand out. First, the collaborative work taught me new research skills that I will be able to use on other research projects (e.g. building the triple hurdle model). Second, the findings of current work and on-going work that involves interdisciplinary collaboration could possibly generate future grant application.

Benefits to the University

Productive and successful collaborative works on my sabbatical guide me in the pursuit of higher impacts in my teaching and research field of environmental and natural resource economics, which ultimately benefit my students in the classroom and the department, college, and university I serve. Not only maintaining the faculty qualifications as scholarly academics that meet Association to Advance Collegiate School of Business (AACSB) standards, but also growing to increase the impacts of faculty on students, research, community, and beyond could make myself better serve the Department, School, and University.

In closing, I would like to thank the Dean and Provost's office for giving me the opportunity to spend a semester focusing entirely on my research. It is my expectation that the work accomplished in Fall 2020 will bear fruit for years to come.

Sabbatical Proposal

The Proposal

Since I joined the Department of Economics in Craig School of Business at California State University, Fresno in August 2013, I have published 12 articles in peer reviewed journals including the top field journal—Journal of the Association of Environmental and Resource Economists (JAERE). I was thankful to have the opportunity to lead the U.S. Department of Energy funded project as Principal Investigator (PI) at Fresno State studying the economic impacts of climate-induced migration using an integrated assessment model (IAM). I also appreciate the opportunity to lead the research project funded by Texas General Land Office 2017-2018 as PI at Fresno State and collaborate with researchers in different institutions to simulate the national-level economic ripples and effects on flood insurance.

My research lies in the field of Environmental and Natural Resource Economics with a focus on climate change and natural disasters. My previous and current research involves examining regional economic impacts of climate change by considering feedback from different markets and updating human behavioral changes. Based on economic theory, I develop hypotheses about how individuals make decisions in response to changes in climate, environmental services, urban amenities, and other related aspects in the environmental system. I use empirical techniques and modeling works to link environmental services to human behaviors and public policies.

To continue my efforts in studying the economic impacts of climate extremes and flood risk and further professional growth and development, I am applying for sabbatical leave in Fall 2020 to conduct a research on flood mitigation and community rating system (CRS). As a result of the requested sabbatical leave by accomplishing the proposed research activity, I will serve

more effectively in my field of Environmental and Natural Resource Economics and better serve the Department, School, and University.

Floods represent the most prominent type of hazards that affect almost all regions of the United States. Policies targeted at combating flood risk are built on three different levels: (1) federal and state-level disaster-aid programs; (2) local and community-level flood mitigation; (3) household-level adaptation. National Flood Insurance Program's (NFIP) community rating system (CRS) is a voluntary and incentive-based programs that connects these three levels. CRS program provides discounts on flood insurance premiums for homeowners in CRS-participating communities in exchange for additional public mitigation efforts beyond NFIP's minimum standards. CRS program specifies 18 different creditable activities ranging from information disclosure to structural flood protection that can be undertaken by participating communities. The credit points earned for various flood mitigation activities determine communities' CRS class ratings. Of the nine classes available, CRS class 1 is associated with the highest premium discount at 45%. The city Roseville in California was the first to reach the highest CRS rating (Class 1). The floodplain management plan has been strengthened in this community since the floods in 1990s and the community-level mitigation efforts have rewarded the community with average premium discount of over $900.

Since the CRS program was enacted in 1994, the participation rate has remained low with large variation in credit points earned among participating communities. Previous studies have examined communities' participation decisions and mitigation efforts separately and found that community risk exposure, income and the size of public sector are the main influential factors (Landry et al., 2011; Brody et al., 2009). To my knowledge, no study has considered decision-

making process in a sequential manner such that communities first choose whether to participate in the CRS program, followed by CRS class choice and the level of mitigation.

In the present study, I will use county-level data across the nation on CRS participation, class ratings, and credit points from 1999 to 2009 to study how previous flood experience, physical risks, socio-economic exposure, and vulnerability affect community's participation, class choice, and the extent of mitigation. The double-hurdle model proposed by Cragg (1971), which is a commonly used estimation strategy that examines participation choice and quantities, is extended in this study to include an additional hurdle to capture not only participation decision but also CRS class choice and the level of mitigation. In the first stage, a probit model is employed to explore main factors that affect the community's participation decision. In the second stage, an ordered probit model is used to model CRS class choices. In the third stage, a truncated normal regression is used to examine community-level mitigation efforts represented by CRS credit points earned. I expect that in addition to physical risks, demographic and socioeconomic characteristics of the community could drive the participation and mitigation decisions. Positive spillover effects are likely to lead to higher mitigation levels in the counties with larger number of CRS-participating communities. The research will provide important insights for local-level flood hazard mitigation and further explore both the drivers and impediments of the program participation and performance. The result will also generate interest from local agencies such as Fresno Metropolitan Flood Control District.

The research idea results from a brainstorming while attending an annual conference in economics in 2017. The data collection process has been completed with collaborative efforts across disciplines and institutions. The following table lists the research timeline that shows a reasonable timeframe during the requested sabbatical leave.

Table 1 Research Timeline

Fall 2020	Month				
TASKS	8	9	10	11	12
Perform Task 1					
Literature Review					
Clean data					
Build the triple hurdle model					
Perform Task 2					
Estimate the empirical model					
Robustness check					
Perform Task 3					
Write the draft and prepare the manuscript for publication					

The findings of the study are planned to be disseminated through an oral presentation at the 2020 North American Regional Science Council (NARSC) that takes place in San Diego, November 11-14 in 2020. Feedback from the audience at the conference will be incorporated in the draft to prepare the manuscript for publication.

Benefits to the Faculty Member

Sabbatical leave will allow me to extend my efforts in studying economic impacts of climate extremes and effectiveness of public policies, which will lead to a greater command of research methodologies in the field of environmental economics. Meeting and collaborating with fellows and researchers in economics, hydrology, environmental engineering, and public policy could expand my research in conducting interdisciplinary studies in the future, which is important especially in the research area studying climate change impacts. The ongoing project may generate great interest among local authorities (e.g. Fresno Metropolitan Flood Control District) and

communities in Sacramento River Basin and San Joaquin River Basin that are associated with high inland flood risk. This can bring opportunities for collaborations both within and outside the region. In addition, the ongoing research could be integrated into teaching materials, which could be used to increase students engagement in active learning using applicable research. Collaborators could be potential guest speakers addressing cutting-edge interdisciplinary research to our students in the future. The research outcomes during the requested sabbatical leave possibly include a conference paper and a manuscript that will be prepared to be submitted to a journal in the field of environmental and natural resource economics. The findings of current work and on-going work that involves interdisciplinary collaboration could possibly generate ideas for grant application.

Benefits to the University

The network of my collaborators will continue to be instrumental in my pursuit of teaching, research, and service objectives. Working with these researchers outside the university could potentially bring future opportunities for inter-institutional collaboration and student exchange programs. I believe that sabbatical offers increased faculty efficiency and productivity, which could better guide myself in the pursuit of higher impacts in the field of environmental and natural resource economics as a faculty member at California State University, Fresno. The knowledge and experience I will gain in the cutting-edge research through collaborations in the interdisciplinary projects that involve understanding the most updated research work in climate change impacts and adaptation could ultimately benefit my students in the classroom. Not only maintaining the faculty qualifications as scholarly academics that meet Association to Advance Collegiate School of Business (AACSB) standards, but also growing to increase the impacts of

faculty on students, research, community, and beyond could make myself better serve the Department, School, and University.

Previous Leaves

No sabbatical leave was applied for previously.

References

Brody, S.D., S. Zahran, W. E. Highfield, S. Bernhardt and A. Vedlitz. (2009). Policy Learning for Flood Mitigation: a Longitudinal Assessment of CRS Activities in Florida. *Risk Analysis*, 29 (6): 912-929.

Cragg, J. G. (1971). Some statistical models for limited dependent variables with application to the demand for durable goods. *Econometrica*, 39(5), 829–844.

Landry, C.E. and J. Li. (2011). Participation in the Community Rating System of NFIP: An Empirical Analysis of North Caroline Counties. *Natural Hazards Review* doi:10.1061/(ASCE)NH.1527-6996.0000073.