Insuring the Labor Market Risks of Health Shocks

Research Proposal for the NBER Program on the Economics of an Aging Workforce

Michael Stepner

December 9, 2015

Health is a major determinant of labor supply and productivity, and adverse health shocks are a substantial source of risk for older workers. Health insurance provides financial security against expensive medical costs, but the costs of falling ill don't end at the hospital or the pharmacy. Many people have a diminished ability to work following a serious illness. Health shocks therefore generate financial risk through their impact on labor market activity, which is not insured by health insurance.

My research investigates the risks borne by older workers by studying how earnings, employment transitions and retirement respond to health shocks, and how social insurance and income assistance programs interact to insure lost income. I will explore how the earnings risks and extent of insurance vary with age, disease type, local labor market conditions, and employer characteristics such as industry, firm size and unionization. This analysis is enabled by a newly constructed administrative database of linked hospital records and tax records covering all Canadians outside Quebec, which I have access to through a collaboration at Statistics Canada. These data combine a 14-year panel of hospital records with a 25-year panel of tax records, providing a rich set of covariates and outcomes to use in studying labor market behavior and government program receipt following a health shock.

Prior work studying the earnings impacts of health shocks has focused on mean impacts on earnings and post-transfer income. In Denmark, average earnings fall by 19% following a heart attack or stroke under age 60, and the Danish government provides nearly full insurance, with post-transfer income falling by only 3% (Fadlon and Nielsen 2015). In the United States, earnings fall by 17% following a hospitalization at ages 50-64 and post-transfer income falls by 12%, according to an analysis of the Health and Retirement Survey (Dobkin et al. 2016). But further work in the U.S. is limited by data availability. There are presently no avenues for linking administrative health records with tax records in the United States, and the HRS is the most detailed survey available.

The Canadian administrative data provide an opportunity to answer new research questions that are relevant to workers in the United States as well as Canada. Like in the United States, the

Canadian government insures roughly one quarter of income losses post-hospitalization through taxes and transfers. By using linked population-level hospital and tax data, I will be able to measure the *distribution* of income losses following a hospitalization, and the types of employment transitions underlying these changes: transitions to another employer in the same industry, transitions to a new industry, transitions to self-employment, and exits from the labor force. And I will unpack important sources of variation in these impacts, such as a worker's level of education, unionization, the physicality of their industry of employment, and the local labor market conditions.

In my preliminary work on this project, I documented that the mean annual earnings of 40-61 year olds fall persistently by approximately 10% following a hospitalization, and I decomposed the insurance role of different government programs—which jointly insure one quarter of these income losses. Figure 1 illustrates these outcomes using an event study plot. For each year between 2008 and 2010, the event study compares Canadians who had an inpatient hospitalization with those who did not. Anyone who was hospitalized in the 3 years prior is excluded from both groups, in order to isolate health *shocks*. All comparisons are performed between individuals of the same age, sex, income decile in event year -1, province of residence, and marital status. In the 3 years following a hospitalization, mean annual earnings fall by 8-10% relative to the pre-hospitalization mean, but the sources of insurance vary over time. Employment insurance provides substantial short-term transfers, disability insurance and cash welfare provide modest long-term transfers, and substantial reductions in tax burdens each year buffer after-tax income. Together these insure one quarter of the income losses, with half of that insurance provided by increased transfers and half provided by reduced taxes.

The earnings impacts of health shocks and the sources of insurance used vary sharply with age. Figure 2 compares the outcomes of 40-44 year old with 55-59 year old workers. Younger workers have larger initial income losses after a health shock, followed by a larger recovery. Older workers have a stable decline in income after the health shock. Employment insurance smooths the large initial dip for 40-44 year olds, but does not provide significant transfers to 55-59 year olds. Long term disability insurance does not provide significant transfers to 40-44 year olds, but provides half of the insurance that 55-59 year olds receive.

My research during the fellowship will extend this work in two directions. First, I plan to expand the sample and outcomes being studied. I will add workers over age 61, to study work and retirement behavior during retirement years. I will begin my sample with hospitalizations in 2003, providing 10 years of post-hospitalization outcomes. And I will move beyond studying mean income changes by: (i) measuring job transitions, industry transitions, and retirement, (ii) decomposing intensive and extensive margin responses, and (iii) measuring impacts on the distribution of earnings and the sources of insurance at different segments of the distribution.

Second, I will examine important sources of heterogeneity in the impacts of health shocks. Specifically, I will extend the analysis of heterogeneity by age shown in Figure 2 to investigate the types of job transitions that health shocks generate at different points in the lifecycle. I will examine whether workplace attributes such as the physicality of work, unionization, and firm size play a substantial role in facilitating or discouraging work following a hospitalization. Studying heterogeneity by disease type will reveal how illnesses differentially impact labor market activity, and identify types of illness whose earnings impacts are poorly insured. I will also investigate the role of local labor market conditions, which may affect workers' abilities to adjust following a hospitalization by finding a new job or a new industry.

The research questions answered by this project are central to understanding the labor market activities and financial security of older workers. Health is a major determinant of work behavior, especially at older ages. But limited survey data have thus far prevented detailed analyses of the linkage between health, employment transitions and social insurance. My research will document how older workers adjust to health shocks, and illuminate the roles of social insurance programs, workplace attributes, age, disease type and local labor market conditions as key determinants of the risks workers face.

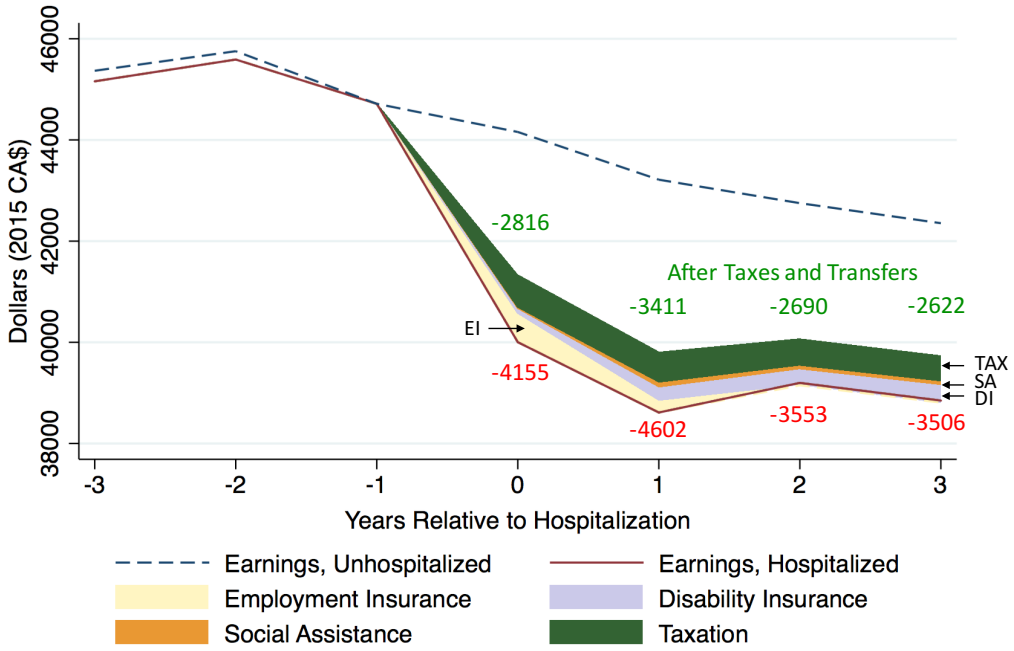
References

Dobkin, Carlos, Amy Finkelstein, Raymond Kluender, and Matthew J. Notowidigdo. 2016. *The Economic Consequences of Hospital Admissions.* NBER Working Paper 22288. http://www.nber.org/papers/w22288.

Fadlon, Itzik, and Torben Heien Nielsen. 2015. *Household Responses to Severe Health Shocks and the Design of Social Insurance.* NBER Working Paper 21352. http://www.nber.org/papers/w21352.

Figure 1

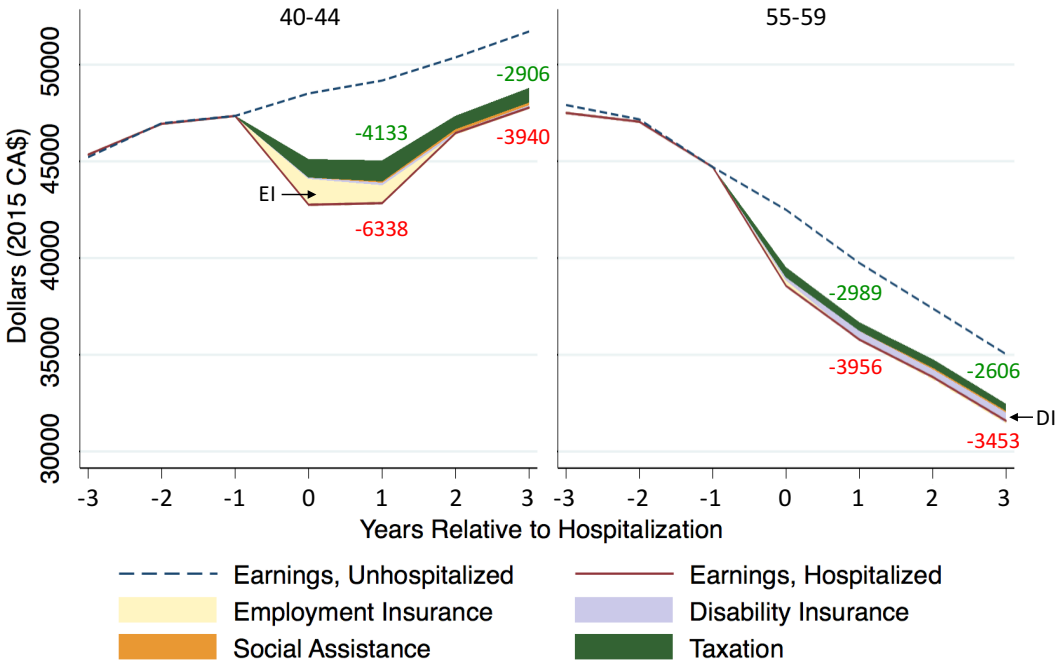
Income and Social Insurance Post-Hospitalization: Ages 40-61



Note: This figure plots an event study comparing Canadians aged 40-61 who had an inpatient hospitalization between 2008 and 2010 with those who were not hospitalized in the same year. Anyone who was hospitalized in the 3 years prior is excluded from both groups, in order to isolate health shocks. All comparisons are performed between individuals of the same age, sex, income decile in event year -1, province of residence, and marital status (using fully interacted fixed effects in the event study regression). The shaded regions are calculated using differences-in-differences, by comparing the difference in income from each government program in year *t* to the difference in year -1. Income from taxation is defined as a reduction in taxes paid.

Figure 2

Income and Social Insurance Post-Hospitalization: By Age



Note: This figure replicates Figure 1, separately for the subsamples of individuals aged 40-44 and 55-59 at the time of hospitalization.

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EDUCATION

Massachusetts Institute of Technology 2013-(2018)
PhD in Economics

- Fields: Public Finance, Health, Labor
- Thesis advisors: Amy Finkelstein and Heidi Williams

McGill University 2009-2012
Bachelor of Arts
First Class Honours in Economics, Minors in Mathematics and Political Science

- Undergraduate theses supervised by Russell Davidson and Krzysztof Pelc

ACADEMIC HONOURS

Graduate

- *NBER Retirement Research Center Fellowship*, 2016-2017
- *SSHRC Doctoral Fellowship*, 2013-2017
- *MIT Fellowship*, 2013-2015

Undergraduate

- *Governor General's Academic Medal*, 2012
  - Top student graduating from any McGill undergraduate program
- *Allen Oliver Gold Medal*, 2012
  - Top student graduating from McGill Honours Economics program
- Scholarships covering full tuition (*C.W. Snyder, C. Peters, and J.W. McConnell Scholarships*)

PUBLICATIONS

"The Association between Income and Life Expectancy in the United States, 2001—2014"
with Raj Chetty, Sarah Abraham, Shelby Lin, Ben Scuderi, Nick Turner, Augustin Bergeron, David Cutler.
The Journal of the American Medical Association (2016), Vol 315, No. 14. (www.healthinequality.org)

PROFESSIONAL EXPERIENCE

Program Reporter 2012-Present
Canadian Institute for Advanced Resarch: Social Interactions, Identity and Well-Being program

- Wrote a report summarizing all research presented at each program meeting

Research Assistant for Amy Finkelstein Spring 2016
Massachussetts Institute of Technology, Economics Department

- Analyzed administrative Medicare data, comparing different models of mortality hazards

Economist Summer 2014
Statistics Canada, Social Analysis Division

- Prepared and analyzed administrative databases of income records and Census records
- Developed tools in SAS to facilitate linkage and processing of large datasets

Harvard LEAP Pre-Doctoral Fellow 2012-2013
Assistant to Professors Raj Chetty and John Friedman, Harvard University, Economics Department

- Analyzed large administrative datasets using Stata, generating results for research papers
- Authored & published Stata ado programs, with a focus on processing large datasets efficiently
- Prepared and reviewed papers before journal submissions, slide decks before presentations

Research Assistant for Maxim Sinitsyn 2010-2012
McGill University, Economics Department

- Designed an experiment, analyzed its results, and wrote the description which appears in:

  Sinitsyn, Maxim. (2012). "Coordination of Price Promotions in Complementary Categories." *Management Science*, 58 (11): 2076–2094. [Section 2: Evidence of Brand Matching Preferences]
- Analyzed, solved and extended game theoretic models from published literature

Summer Intern Summer 2011
Analysis Group, Health Care Consulting Services, Montreal Office

- Wrote SAS programs to conduct statistical analyses comparing competing drugs' economic and health outcomes, using large retrospective insurance claim databases

Research Assistant for Daniel Parent Spring 2010
McGill University, Economics Department

- Designed and programmed a user-configurable script for processing Census and Labour Force Survey data into descriptive statistics and graphs

PUBLISHED STATA PROGRAMS

binscatter.ado – Generates binned scatterplots

maptile.ado – Makes it easy to map a variable in Stata, using downloadable templates

fastxtile.ado – Rewritten version of built-in command **xtile**, runs much faster in large datasets

vam.ado – Computes drift-adjusted teacher value-added estimates

mergepoly.ado (with Robert Picard) – Merges adjacent polygons in maps, removing shared borders

SKILLS

Software: Stata, SAS, Python, Matlab, Julia, Git

Languages: English and French, fluent

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January 13, 2017

Dear Committee Members:

I am writing with the greatest enthusiasm in support of **Michael Stepner's** application to the NBER Pre-Doctoral Fellowship Program on the Economics of an Aging Workforce. Michael is fourth year economics PhD student at MIT. He is incredibly bright and able, and is well underway with a promising research project using linked Canadian population-level hospital and tax data. I give him my strongest recommendation.

I know Michael well. He was an excellent student in my graduate public finance class, worked as an RA for me last year on a project (with Heidi Williams and Matt Gentkzkow) on the impact of geography on mortality in the US, and is my PhD advisee. He has impressed me both in class and as an RA with both his technical acumen – as an RA he proactively took the lead in suggesting and then determining how to implement a non-linear mortality hazard model analysis that was simultaneously both quite difficult to implement in our context and quite important to verify robustness to.

Above and beyond his technical chops, Michael has also impressed me greatly with his "economics" and "research" sense and judgement. For example, the project he RAed on is closely related to work he c-oauthored in *JAMA* (with Raj Chetty, David Cutler, and others) on the relationship between income and life expectancy in the United States. That excellent and important paper had, among other things, documented striking geographic variation in mortality (particularly for low income individuals) that is correlated with health behaviors. In some sense, the project he was RAing for is motivated by these striking correlations and attempting to see if we can get causal estimates of the impact of places and the reasons for them. Time and time again Michael impressed us with his knowledge (both of the economics and the related literatures), insights, and suggestions.

Usually for a pre-doctoral candidate at an early stage the strongest letter I can write is to talk (as I have) about my impressions of the candidate and then say that the research proposal "sounds promising." What makes Michael an exceptionally strong candidate is his project is well along and clearly past escape velocity. Michael took the initiative and devoted the energy over 2 years (starting in his first in graduate school) to work patiently to gain access to a novel and incredibly exciting linked administrative panel data set in Canada between hospital records and tax data. He has gotten his hands dirty with the data already and presented in a lunch

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workshop this fall that demonstrates there is a "there there." His preliminary work (a small portion of which he included in his proposal) has set up a compelling "event study" machinery to examine the impact of hospital admissions on earnings and social transfers (such as disability insurance and employment insurance). Among other things, this has uncovered a difference in the impact of health shocks by age (40-44 year olds vs 55-59 year olds), with older workers experiencing longer long-run effects on earnings. More needs to be done to uncover why (e.g. is it differences in health shocks) and to extend to even older ages (e.g. 61+) where retirement behavior may become even more important.

At a minimum, Michael is poised to produce an extremely important set of new facts about how hospitalizations affect earnings and social transfers over the life cycle. In this sense he is a "sure bet" for a "return on investment" as a pre-doc. I hope and suspect that this will be only the beginning, and that he will use his considerable skills to put the compelling descriptive results he is in the process of producing into an economic framework to help answer additional questions (such as the welfare consequences of the effects he is documenting, or the joint process by which health shocks and labor market shocks influence both health and labor market outcomes, and potentially each other).

In sun, this is an excellent and promising PhD student with an exciting and "definitely doable" project under way. The upside is unlimited. I give him my very strongest recommendation.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely,

Amy Finkelstein

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