Siddhartha (Sid) Sanghi
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October 8, 2019

NBER Health Economics Boot Camp
1050 Massachusetts Ave.
Cambridge, MA

Dear NBER Health Economics Boot Camp Selection Committee,

I am a PhD Candidate in Economics at Washington University in St. Louis writing to apply for the NBER Health Economics Boot Camp 2019.

My dissertation looks at dynamics investment decisions in health and human capital. For the first chapter, I am working on understanding the rising health inequality across income group in the US that I have described in the enclosed essay.

My dissertation advisors, Prof. Rodolfo E. Manuelli (manuelli@wustl.edu) and Prof. Barton H. Hamilton (hamiltonb@wustl.edu) will be sending their reference letters in support of my application.

It would be great if you could kindly consider my application for the prestigious NBER Health Economics Boot Camp 2019. I'd be happy to provide you any further information that you may need.

Sincerely yours,

Siddhartha Sanghi

encl: Curriculum Vitae, Essay

SIDDHARTHA (SID) SANGHI

1 Brookings Drive ◇ Campus Box 1208 ◇ St. Louis, MO 63105
314 · 630 · 3747 ◇ sanghi@wustl.edu ◇ www.sidsanghi.com

EDUCATION

Washington University in St. Louis *2021 (expected)*
Ph.D. Candidate in Economics

Thesis Title: "Dynamic Investment Problems: Health, Human Capital and Entrepreneurship"
Committee: Rody Manuelli, Barton Hamilton, George Levi-Gayle, Francisco Buera, Yongseok Shin

Indian Institute of Technology, Kanpur *2010 - 2015*
M.Sc. (Integrated) Economics

RESEARCH INTERESTS

Macroeconomics, Labor, Health, Entrepreneurship

RESEARCH

Work in Progress

- Health Inequality: Role of Insurance and Technological Progress
- Human Capital Investment and Taxation (with Rody Manuelli)
- Household Self Employment (with Barton Hamilton, Andrés Hincapie and Nicholas Papageorge)
- Constraints to the Growth of Firms (with Francisco Buera and Yongseok Shin)

Research Experience, Washington University in St. Louis

- Research Assistant for Prof. Rody Manuelli *August 2018 - present*

TEACHING

Instructor, Washington University in St. Louis

- Money and Banking, Econ 335 *Summer 2017*

Teaching Assistant, Washington University in St. Louis

- Intermediate Macroeconomic Theory, Econ 4021 *Fall 2017, Spring 2018*
- Applied Econometrics, Econ 4151 *Spring 2017*
- Applied Econometrics (Graduate Level), Econ 5161 *Fall 2016*

PROFESSIONAL ACTIVITIES

Affiliations

- U.S. Census Bureau, Special Sworn Status Researcher *2019 - present*
- Fellow, Koch Center for Family Business, Olin Business School *2019-20*

Presentations *(*: scheduled)*

· 2019: NBER Macroeconomic Perspectives on the Value of Health (Discussant)*; Midwest Macroeconomics Fall Meetings*; Midwest Economic Theory Conference*; Olin Business School; EEA-ESEM, Manchester, UK; SED Annual Meeting; ASHEcon; Midwest Economics Association/SOLE

· 2018: Midwest Macroeconomics Meetings, Nashville; Economics Graduate Student Conference, WashU; EEA-ESEM, Cologne, Germany; CHEPAR Meeting, Institute for Public Health, WashU

· 2014: Eco^2, London School of Economics and Political Science, London

Other Invited Conferences and Workshops *(*: scheduled)*

· 2019: Annual Health Econometrics Workshop (AHEW)*; Becker Friedman Institute (BFI) Price Theory Summer Camp

Referee Service

· Journal of Macroeconomics

Department Service, Washington University in St. Louis

· President, Economics Graduate Student Association (GSA) *2018-19*

· Senator, Graduate Student Senate & Student Representative, Graduate Council *2018-19*

· Organizer, 12$^{\text{th}}$ Economics Graduate Student Conference (EGSC) *2017*

GRANTS AND FELLOWSHIPS

Grants

· $10,000 Small Research Grant, Weidenbaum Center (co-PI) *2018-19*

Awards and Fellowships

· Dissertation Fellow, Koch Center for Family Business, Olin Business School *2019-20*

· University Fellowship, Washington University in St. Louis *2015-16, 2017-18, 2018-19*

· Travel Awards: European Economics Association (EEA)*(2018 & 2019)*; Center for Research in Economics and Strategy (CRES), Olin Business School *(2018 & 2019)*; Graduate School of Arts and Sciences, WashU *(2018 & 2019)*; Department of Economics, WashU *(2018 & 2019)*; IIT Kanpur *(2013 & 2014)*

· Teaching Assistantship, Washington University in St. Louis *2016-17*

· Summer Fellowships: Washington University in St. Louis *(2017 - 2019)*; Department of Banking and Finance, University of Zurich *(2014)*; International Organization of Securities Commissions (IOSCO), Madrid *(2014)*; Motu Economic and Public Policy Research, Wellington *(2013)*; Theoretical Stats-Maths Unit, Indian Statistical Institute, Kolkata *(2012)*

· Center Sector Scholarship by Ministry of Human Resource Developement *2010-15*

LANGUAGES

· English (Fluent), Hindi (Native)

CITIZENSHIP

· India (F-1 Visa)

REFERENCES

· Prof. Rody Manuelli
Department of Economics
Washington University in St. Louis
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· Prof. Barton Hamilton
Olin Business School
Washington University in St. Louis
St. Louis, MO- 63105
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· Prof. George-Levi Gayle
Department of Economics
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· Prof. Francisco (Paco) Buera
Department of Economics
Washington University in St. Louis
St. Louis, MO- 63105
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GRADUATE COURSES

· Completed: Macroeconomics I & II; Economic Growth I & II; Seminar in Dynamic Economics; Money and Macroeconomics Workshop; Seminar in Growth and Development; Microeconomics I & II; Quantitative Methods in Economics I; Advanced Quantitative Methods in Economics; Introduction to Econometrics; Applied Econometrics; Advanced Microeconometrics; Financial Economics I; Advanced Asset Pricing; U.S. Macroeconomic Policy After the Crisis of 2008-2009

· Ongoing: None

Last updated: September 23, 2019

NBER Health Economics Research Boot Camp 2019

Sid Sanghi[†]

There is a huge disparity in health outcomes across income groups in the US. Using the data from 2000-2014, Chetty et al. (2016) found that the gap in life expectancy between the poorest 1% and richest 1% was 14.6 years for males and 10.1 years for females. Another remarkable finding was that during the same period, the life expectancy for males increased by 2.34 years for the top income group but only by 0.32 years for the bottom income group[1]. Similarly for females, the increment in life expectancy was 2.91 years for those in the top income group, but only 0.32 years for the bottom income group. On the other hand, in another recent paper, Ales, Hosseini, and Jones (2012) show that the total health spending (sum of insurance, Medicare, Medicaid and out-of-pocket) looks very comparable in absolute dollars across income groups.

It is quite puzzling that while the total healthcare spending looks very similar across income groups, the health outcomes are very different and have worsened over time. In this backdrop, part of my dissertation explores the role of health insurance and its interaction with medical technological progress to explain part of the rising health inequality[2] in the US over the past decade and its aggregate implications for output. To this end, following the strand of literature modeling health as health capital (a 'la Grossman (1972) and Gilleskie (1998)), I am developing a continuous-time life-cycle model of an economy with endogenous health insurance premium. I incorporate the decisions of whether to purchase health insurance, timing to visit the doctor, how much to invest in their health capital and whether to engage in addictive bad behavior.

My rich quantitative model – estimated from linked National Health Interview Survey and Medical Expenditure Panel Survey – would be well suited to: understand and quantify the channel through which health insurance affects individual's decisions on health spending, frequency of visits to the doctor, health outcomes such as mortality; quantify the impact of "Medicare-for-all" on health outcomes and worker productivity; and effect of population aging on the optimal design of health policies.

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[1]Mean income for top income group was $256,000 and $17,000 for the bottom income

[2]Defined as life expectancy at the age of 25 or 40

I would like to delve deeper into a county and zip-code level analysis of health inequality in the US, in my future work. There are known differentials in healthcare access across poor and rich counties. Furthermore, my preliminary analysis suggests that access to fresh food may also be different across counties. While fresh fruits and milk are more expensive in poor counties than the national average, soda is cheaper than the national average. Poor counties also have a higher per capita fast food expenditure than freshly cooked food expenditure. Thus, I would like to explore the role of healthcare access, environment and fresh food availability in explaining the rising health inequality across counties in the US.

In my future work, I would also like to explore certain extensions stemming from my current project. Firstly, I would like to exploit the rich heterogeneity in the health insurance plans, in terms of coverage and quality of service provided, into my work to better understand the income and wealth differentials in health outcomes. Secondly, I would also like to fully endogenize the human capital accumulation process over the life-cycle (like health capital accumulation process in my current project) to understand the role of poor health on output and economic development in low-income countries. However, rich panel-data with multiple generations would be needed for this analysis.

The bootcamp would provide me with a wonderful opportunity of learning from and interacting with the likes of Amy Finkelstein, Jonathan Gruber, Ben Handel, Kate Ho and Jonathan Kolstad, who are some of the leading experts in the topics I am working on. It would be great to learn various other aspects of health economics research such as health insurance markets, role of individual behavior and insurance and to learn about new datasets that I can use in my future research. It would be a great opportunity to know about the frontier of health economics research and exchange ideas with the leading researchers in the field.

I strongly feel that the bootcamp would not only help my current project but would go a long way in shaping my research as an economist. Hence, I would be grateful for the opportunity to participate in the NBER Health Economics Research Bootcamp.

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Washington University in St. Louis

Rodolfo Manuelli
James S. McDonnell Distinguished University Professor in Arts and Sciences

Saint Louis, October 7 , 2019

To whom it may concern

This is a letter of recommendation for Siddhartha Sanghi who is a Ph.D. student at Washington University in St. Louis. I know Sid well. He took two classes from me, he is my RA and my advisee.

I think that Sid is an extremely promising researcher. He has tools and lots of ideas. He is not afraid of tackling hard problems in an unconventional way. His set of tools includes a fair amount of familiarity with continuous time stochastic general equilibrium methods and models, and he is extremely good (and careful) at developing computational techniques.

Sid has been working on several projects but I want to highlight his work on health care. There are two dimensions of his work that are truly innovative and that make the model potentially useful to formulate health care policies. In the model, Sid allows individuals to endogenously choose the level of insurance (and the pricing of insurance is endogenous as well) and to react to signals about their health condition. Going to a doctor visit (or an emergency room visit) is a stopping time problem that depends on the evolution of health and wealth. The model is rich enough to accommodate different health care technologies. For example, one could imagine a technology that requires continuous spending on health and that succeeds in keeping health capital at a given level in the absence of major shocks. An alternative technology has zero variable cost but convex recovery costs. Thus, an individual choosing this technology will spend zero on a per period basis but will have to undergo a more expensive treatment once his human capital has deteriorated to a low level. Sid's model suggests that individuals will sort themselves out among those two treatments based on income.

On the empirical side, Sid has been putting together a rich data set to estimate the key parameters of the model. He is using data from the National Longitude Mortality Survey (NLMS) and the Medical Expenditure Panel Survey (MEPS) along with the data from Mortality Differentials Across Communities (MDAC) to link the data to a sample of public use harmonized IPUMS-NHIS with restricted geographical and income variables to exploit heterogeneous conditions across locations to identify the parameters of the model.

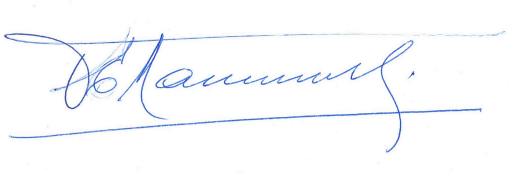
Just putting together a detailed data set with information about income, health care utilization, health expenditure and health outcomes at a fine geographical location is an important contribution to our understanding of health care choices.

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Even though the health care project looks at individuals, Sid is interested in the macro effects. Thus, for him, health care is another form of human capital that has consequences for aggregate output.

If there is anything missing from Sid's approach is a deeper understanding of the most important issues and techniques in the health economics field. I believe that the NBER camp will be extremely useful to him. It will help him understand the field better and it will expose him to a different (relative to what he gets here at WashU) approach

Sid Sanghi is deep, broad and tooled up. He picks challenging research questions and works hard. He is creative and has a knack for choosing the right models to think about economic questions. He will definitely benefit from the NBER camp.



Rody Manuelli
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Washington University in St. Louis
Barton Hamilton
Robert Brookings Smith Distinguished Professor of Entrepreneurship

October 10, 2019

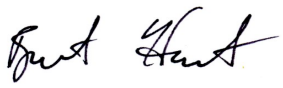
Letter of Recommendation for **Sid Sanghi**:

It is a pleasure to strongly and enthusiastically recommend Sid Sanghi for the NBER Health Economics Research Bootcamp. I am one of Sid's principal thesis advisors (along with Rody Manuelli) and have been interacting with him regularly for the last 2 years on his dissertation research. Let me state at the outset that Sid is the most promising PhD student in economics at Washington University since my former student Andres Hincapie, who is currently an Assistant Professor in the economics department at the University of North Carolina, Chapel Hill, and Julieta Caunedo, who is at Cornell. Sid is an extremely bright and hardworking PhD student who is exceptionally well trained in structural micro econometric methods.

I believe Sid's dissertation has the potential to substantially impact research in health care. He begins with the observation that while spending on health care is very similar across income groups, there are substantial disparities in health outcomes (e.g., mortality) across these same groups. To investigate this puzzle, Sid builds a dynamic life-cycle model that examines the interactions between the individual's decision to invest in health capital, purchase health insurance, access health care services, and medical technological progress. He then fits the model using a variety of available data sources, such as the NLMS, NHIS, and MEPS. One of his striking initial results is that after a doctor visit, the health of a high-income individual improves, while that of a low-income individual gets worse. To understand this point, consider a cancer patient. The rich individual routinely goes to the doctor, and a cancer is diagnosed at Stage 1. Subsequent treatment is then effective at restoring the patient to health. On the other hand, due to barriers to access, the poor individual waits to see the doctor and the cancer is diagnosed at Stage 4. Treatment in this case is much less effective and the individual's health declines. Consequently, despite similar health expenditures on rich and poor patients, outcomes are substantially different due to barriers that affect the timing of diagnosis. Using this model, Sid plans to consider the impact of a variety of alternative health policies, such as "Medicare for All," on health disparities and expenditures.

I am extremely enthusiastic about Sid's abilities and his dissertation work. He has the potential to be a leading scholar among individuals conducting empirical studies in health care closely tied to economic theory. The NBER Health Economics Research Bootcamp will provide him great exposure to a wider variety of scholars and research in health economics, which will be extremely beneficial to his development. Please do not hesitate to e-mail me at hamiltonb@wustl.edu or call me at (314) 935-8057 if you have any further questions about this outstanding candidate.

Sincerely,



Barton Hamilton
Robert Brookings Smith Distinguished Professor of Entrepreneurship

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