Prospectus Outline

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12 April, 2021

Work in Progress. Please do not cite. Comments and suggestions welcome.

This document is for potential advisors. I give a brief outline of each of my planned dissertation chapters.

My research focuses on maternal-infant well-being. My outcome or measure is generally biological: anemia, height or infant sex ratios. The causes I analyze are diverse, varying from market volatility to industrialization. Beyond cause and effect, I also try to understand the mediation of these drivers through social cultural practices.

My goal is for the dissertation to be interdisciplinary in a specific form:

1. Physiology and biology provide an outcome of study and a mechanism for its causes;
2. Applied econometrics provides statistical methodology for evaluating cause and effect; and,
3. Anthropology allows me to interpret, qualify and nuance these results.

In this way, I hope to build a set of knowledge in between the "hard" and "soft" social sciences, positioning myself as an economist who understands, and takes seriously, biology and anthropology.

1 The 2008 Food Crisis in Senegal: Maternal-Infant Health and Parental-Social Responses[1]

Motivation: The world's poor are increasingly dependent on local and international markets for their food (Bernstein 2010), entangling the food security of the world's poor with macro-economic crises. In 2008, such a crisis was realized when world rice prices tripled over a couple of months. Using data from Senegal, I will analyze both the consequences of the crisis on maternal-infant health as well the responses and experiences of the people and communities affected.

My goals are:

1. Use applied econometrics to estimate the effects of the crisis on infant anemia, parental responses in terms of infant-feeding patterns and birth intervals, as well as the household and social mediators of these effects; and,
2. Use interviews and surveys from 2008 to build an understanding of how households coped with the crisis.

Contribution: The 2008 crisis has attracted much attention by scholars across disciplines (Mittal 2009; Martin-Prevel et al. 2012; Cohen and Garrett 2010; Rosset 2008), but its effects on health are difficult to disentangle from confounding factors (Dimova and Gbakou 2013; Arndt et al. 2016). I develop a fetal-origins identification strategy, focusing on infant hemoglobin and iron stores. Fetal iron stores depend on maternal nutrition, while infant iron stores do not (Camaschella 2015). This generates a clear control group, infants who were born just before the crisis, allowing me to identify the effects of the 2008 crisis on infant hemoglobin.

My contribution is also methodological. The interpretation of reduced-form estimates is a widely known problem in econometrics (Deaton 2009), where average treatment effects have no clear meaning in any structural model, and are subject to many plausible *mechanisms* or *narratives*. Ethnographic methods, like interview and participant observation, would connect statistical results to the actual experiences of the population of interest.

Progress: In the stages of preliminary data analysis, while also trying to build contacts in Senegal to facilitate qualitative research.

Key Literatures: Fetal origins, food entitlements and vulnerability, moral economy.

Data Sources: Demographic and Health Survey (DHS). Qualitative surveys by the Senegal government about the 2008 crisis (currently applying for permission to the data).

[1] For an outline of the econometric section, see here.

2 Dynamic Complementarity in Child Growth: Evidence from Indonesia[2]

Motivation: The shape of the human capital production function, and to what degree nutrition is substitutable or complementary across time, has important implications for the optimal timing of nutritional interventions and inequality (Heckman 2006, 2007). Understanding the process of human capital formation also requires understanding parental and social investment behaviors (Almond and Currie 2011). The *thrifty phenotype* hypothesis, which posits that poor maternal nutrition causes fetal development into a child with slower metabolism and growth (Hales and Barker 2001), can be expressed within Cunha and Heckman's capacity formation model as a statement of dynamic complementarity. I will test for dynamic complementarity in child growth using height data from Indonesia in the decades around 2000. Furthermore, I will also explore parental responses, in the form of feeding practices and immunization rates.

Building off of existing studies, I combine the research on the health effects of Ramadan fasting with the impact of rainfall in rural Indonesia. This project bridges the gap between research in economics and physiology, expressing a physiological hypothesis within the empirical framework of applied econometrics.

Contribution: Well-identified tests for dynamic complementarity are rare because of the need for two natural experiments (Almond, Currie, and Duque 2018). Recent progress on the question has been almost exclusively focused on educational outcomes (Duque, Rosales-Rueda, and Sanchez 2018; Malamud, Pop-Eleches, and Urquiola 2016; Bau et al. 2019; Johnson and Jackson 2019). As height is yet unstudied in the literature, my project would fill a gap in the growing field of empirical tests of dynamic complementarity.

Progress: I have written a research sketch and secured the necessary data.

Key Literatures: Fetal origins, human capital production, parental responses.

Data Sources: IFLS, Indonesia DHS, NOAA rainfall.

3 Infant Sex Ratios and Historical Living Standards[3]

Motivation: While abnormally high infant sex ratios have long been studied for their implications for sex-discrimination (Sen 1990), little attention has been given to the phenomenon of abnormally *low* sex ratios. Recent research in physiology suggests that low sex ratios reflect poor maternal conditions, including pollution, stress and malnutrition. Therefore, infant sex ratios are a potentially informative measure of living standards. Furthermore, infant sex ratios are easily calculated from historical census data, shedding new light on populations for whom we lack basic measures of health and well-being.

Contribution: The sensitivity of infant sex ratios to maternal and infant well-being is well established (James and Grech (2017); see the Catalano et. al. papers below). Our contribution is to apply these findings to historical census data, shedding new light on previously understudied populations, including Antebellum slaves, colonized peoples, and 19th century Europeans.

Progress: This is a joint project with James R Irwin (retired economist historian and my father). We are presenting about this topic in the Canadian Economic Association Conference, June 2021.

Key Literatures: Biology and demography of sex ratios, 19th century standard of living debate.

Data Sources: Historical censuses from Europe, North America, and European colonies.

[2]For a more complete outline, see here.
[3]For the current state of the project, see here.

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