Miguel Sarzosa – Research Statement

My research focuses on the impact of various contexts on the accumulation of skills in infants, children, and adolescents, and how these skills can affect their outcomes later in life. I examine factors such as prenatal health, grade retention, in-classroom social interactions, teacher quality, gender norms, and discrimination. I investigate how children learn, how resource scarcity and peer interactions can affect learning, and how learning differentials affect success in adulthood. My work emphasizes socio-emotional skills (noncognitive, soft skills) as essential components of the learning process and critical drivers of social interactions and adult outcomes.

One area of research that aligns with these interests is school bullying. While bullying is a pervasive feature of the education process, the economic literature has yet to fully explore its impact. In my articles "Bullying in Teenagers, The Role of Cognitive and Noncognitive Skills" (co-authored with Sergio Urzúa, Professor at the University of Maryland) published in *Quantitative Economics* and "Victimization and Skill Accumulation: The Case of School Bullying" published in the *Journal of Human Resources*, I investigate the causal impact of bullying on the development of children and adolescents. Because bullying is endogenous and dependent on individual and peer characteristics, I implement semi-structural models of unobserved heterogeneity to estimate its effects. Additionally, I leverage an administrative feature of South Korea that prevents classroom sorting, creating random peer groups within school districts.

In the QE article, we produce the first causal estimates of the harmful impacts of school bullying on later physical and mental health. We find that bullying increases the uptake of risky behaviors and decreases the victim's chances of pursuing a college degree. By leveraging unobserved heterogeneity, we show that bullying victimization is more likely and its adverse effects are stronger among children who start middle school with low noncognitive skills. In my *JHR* article, I explore the mechanisms that cause the treatment effects we document in the *QE* article. I build and estimate a dynamic model of skill formation based on Heckman, Cunha, and Schennach (2010), which incorporates an endogenous treatment dependent on past levels of latent skills and classmates' traits and treatment-condition-specific skill production functions. To achieve identification of the treatment effects in the dynamic model, I use the random allocation of students to classrooms and quantify how ‘‘rare’’ a student is in their classroom by counting the number of classmates whose traits (skills, household income) lie within an epsilon-ball of the student's traits. Being ‘‘common’’ reduces the chances of victimization by about 10%. I find that victimization depletes the average child's current noncognitive skill levels by 40% of a standard deviation, making the individual 34% more likely to experience bullying again. Therefore, bullying triggers a self-reinforcing mechanism that opens an ever-growing skill gap.

My research on school bullying spurred my interest in better understanding the consequences of school peers on learning, while keeping in mind that classroom composition plays a vital role in determining the nature of social interactions. I take this step in my paper with Assistant Professor Torsten Santavirta (University of Helsinki), currently *R&R in Quantitative Economics*. We inquire about the role of social interaction intensity in determining the spread and reach of classroom peer effects by incorporating friendship links as the vehicles that spread them. We use survey and administrative data from Stockholm, where we observe friendship nominations. We endogenize friendship links using information on predetermined characteristics in a friendship formation model based on homophily and unobserved degree heterogeneity. To avoid reverse causality, we focus on the peer effects emanated from children from abusive and neglectful parents. We find that the close friends of the parentally abused and neglected student face the largest adverse effects. The effect fades out with social distance to the point that being three peers away from an abused and neglected peer is equivalent to not having such peers. The

diminishing effects as social connections lengthen reflect that the parentally abused students are not capturing resources (e.g., teacher's time disciplining her) or derailing learning for everyone in the classroom. We then estimate a structural model of peer effects to disentangle the mechanisms. The abused and neglected peer's lower verbal ability harms her friends' verbal ability, while the disruptiveness itself is what harms classmates' numeric ability.

Children's skill endowments are also tightly linked to prenatal conditions. In my article "The Children of the Missed Pill" (joint with Professor Tomás Rau from Universidad Católica de Chile and Sergio Urzúa from Maryland), published by the *Journal of Health Economics*, we consider the fact that the health distribution of the children we observe is actually truncated due to the availability of contraceptive methods. The Fetal Origins Hypothesis and the evidence found on it so far document that children born in families with fewer (financial, emotional, and health) resources face bleaker futures. Thus, there is reason to believe the conceptions avoided by contraceptives would be more likely to have fallen on the left side of the health distribution. To explore that margin, we use a massive collusion case where pharmaceutical retailers dropped the prices of all oral contraceptives for a year and then increased them overnight sharply. We show that while fetal and infant deaths were falling as contraceptive prices dropped, they spiked up when prices rose. We also document a disproportionate increase in low-weight births. As children reached school age, we find lower school enrollment rates and higher participation in special education programs. Our evidence suggests these "extra" conceptions were more likely to face adverse conditions during critical periods of development.

The quality of teachers greatly impacts the skills of children, and education systems worldwide struggle to attract the best high school graduates to the teaching profession. However, this is largely due to the fact that teachers are often poorly paid, given their skills. In our article, "Unintended Consequences of Free College: Self-Selection into the Teaching Profession," published in the *Economics of Education Review* with co-authors Rosa Castro-Zarzur (AIR) and Ricardo Espinoza (OECD), we explore how making college free for the bottom 50% of the income distribution in Chile inadvertently worsened—in terms of average cognitive scores—the pool of prospective students interested in becoming teachers. This occurred because before the free-college policy teaching programs were favored by relatively poor high-scoring students, as they were one of the few paths to a college degree. After all, they had the least expensive tuition. The free-college policy effectively equated the tuition of all programs to zero regardless of their earnings potential. Thus, it decreased the relative returns to graduating from a teaching program. These relatively poor high-scoring students now sort into higher-paying majors.

Skills are thought to be acquired following hierarchical rules where the attainment of more advanced skills builds on foundations laid down earlier in the form of lower-level abilities. However, as in standard settings cognition development is closely linked to age, that building block theory has rarely been tested at very low levels of cognition among school-aged children. In Muslim-majority sub-Saharan countries, many children attend Koranic schools instead of formal schools. The Koranic schools' only goal is to make students memorize the Koran. They do not teach math or literacy. Koranic schools' alumni rarely transition to formal schools as their families often distrust the secular education system and because they have no basic skills to help them cope with formal school. Together with Koji Miyamoto and Moustapha Lo (World Bank), we implemented a large-scale RCT where 600 Koranic schools were randomly divided into three groups. One group received Math and French teachers. Another group received Math and French teachers who attended Socio-Emotional Learning (SEL) training. The control group kept business as usual. We find sizable impacts of the non-SEL intervention, driven by improvements in the building blocks of math and language. Due to their lack of formal education, pre-intervention students' mastery of those building blocks was minimal. Thus, the intervention helped fill in those existing voids required as foundations for

developing higher-level skills. We also find positive effects on socio-emotional traits associated with a greater interest in people and ideas beyond oneself. These results reflect that the program provided a pathway to more diverse experiences, invigorating children's instinct to explore their world. We also find that the SEL-trained teachers achieved null effects due to the communities' resistance to the SEL intervention as it was wrongly considered a vehicle for Western values that antagonize Conservative Islamic morals. This paper is the first to show that it is possible to use traditional religious schools to reach a massive fraction of students outside the formal education system.

My work on labor market disparities against sexual minorities is another clear example of societal contexts affecting the relationship between skills and adult outcomes. In the paper "Sexual Orientation and Labor Market Disparities" accepted at the *Journal of Economic Behavior and Organization*, using an extended Roy Model—where I endogenize schooling and employment decisions—on longitudinal data from Norway, I find that while sexual minorities who work do not face earnings differentials, they are 10–20 percentage points less likely to be employed than comparable heterosexual adults. The results suggest that selection into employment contributes to eliminating the observed income gaps among the employed by making the average sexual-minority worker more skilled than their heterosexual counterpart. An additional methodological contribution of this paper is that it considers sexual orientation as an unobserved—to the econometrician—continuous latent variable, providing insight into how different degrees of homosexuality can have on the labor force.

I apply the same notion (i.e., the existence of a latent continuous characteristics that is overlooked in favor of the analyses of binary groupings) to the context of gender. In the paper "Childhood Gender Nonconformity and Gender Gaps in Life Outcomes" (joint with PD Student Abi Banan, Purdue, and Assistant Professor Torsten Santavirta, Helsinki), we consider the known fact that the within-gender differences in cognition, traits, and preferences are larger than the between-gender differences. We argue that that results from a non-trivial variation in the degree of conformity to societal gender prescriptions. We exploit variation in preferences and behaviors during childhood to study how nonconformity to gender norms predicts lifetime outcomes. Using a unique longitudinal survey and register data, we show that gender-nonconforming girls have substantially better education and labor market outcomes than gender-conforming girls. In contrast, gender-nonconforming boys perform substantially worse at school, sort into lower-paying occupations, earn less, and have a greater incidence of mental health disorders and substance abuse during adulthood than gender-conforming boys.

I am currently working on projects deepening my involvement in the fields of gender discrimination and skill formation. One project addresses how gender discrimination operates in a heavily regulated market, like one of unionized public school teachers. In another project, joint with Assistant Professor Fernando Saltiel (McGill), I inquire about how early grade repetition (K-1st grade) shapes cognitive and noncognitive skills formation process. Implementing a dynamic model of skill formation with endogenous retention—that depends on baseline skills—using data on the US, we find that retention negatively impacts students' cognitive abilities yet boosts noncognitive skills for low-skilled students at baseline.

Because of children's skill accumulation and how much those skills matter for future adults, I consider that my research should have a policy impact. To that end, I have had the opportunity to talk to Indiana's state lawmakers regarding peer effects and strategies to remediate the skill losses caused by the COVID-19 pandemic and the associated school closures. I am also currently a committee member in the National Academies of Science, Engineering, and Medicine's committee on the impact of social media on the health and well-being of children and adolescents.