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Dear Hiring Committee,

This statement outlines my research goals, academic achievements, and future endeavors.

I am an applied econometrician with a keen interest in leveraging public policies to tackle major societal challenges, including poverty reduction, crime prevention, inequality mitigation, and health improvement. My primary area of expertise is in conducting policy evaluations of social interventions aimed at addressing these challenges by enhancing human capital. Additionally, I have authored several theoretical and methodological papers that provide solutions to pertinent issues in the field of policy evaluation.

A key theme of my research agenda is the study of the long-term benefits of interventions designed to break the cycle of poverty for disadvantaged families in the United States and worldwide. I have conducted in-depth policy evaluations of programs such as the Perry Preschool Program, the High/Scope Comparison Study, the Abecedarian Project, the Nurse-Family Partnership, the Jamaican Intervention, and the Moving to Opportunity initiative. Additionally, I have conducted applied research using observational data from various countries, including the United States, Germany, and China.

Policy evaluation is a data-driven field that combines three essential realms of knowledge: economic theory, causality, and microeconometrics. Economic theory helps frame relevant questions, establishes relationships among model variables, and determines the decision-making behaviors of heterogeneous agents. Causal theory provides a rigorous framework for defining counterfactuals and causal effects of interest. It is also fundamental for investigating the identification of these effects from observed data. Finally, microeconometrics offers a plethora of possibilities for estimating, testing, and forecasting causal parameters. Throughout my academic career, I have worked on approximately two dozen empirical and theoretical papers that address various challenges in these three realms of knowledge.

Some of these papers have been published in renowned journals, including the American Economic Review, Econometrica, Science, Quantitative Economics, Journal of Public Economics, and the Economic Journal, among many others. To date, my publications have received more than 9,000 citations, averaging over 1,000 citations per year.

My methodological contributions to the field of policy evaluation include investigations into the identification of treatment effects, small sample inference, mediation analysis, cost-benefit analysis, factor analysis, and several estimation techniques. Furthermore, I also have methodological contributions to theory of causality. My empirical papers often use a diverse range of evaluation approaches tailored to the research question at hand. Lately, I have worked on methods that combine economic theory on **choice behavior** to enhance causal inference in policy evaluations that employ instrumental variables. My most recent papers combine economic analysis with **machine learning** techniques to enhance policy evaluations.

This statement serves as a concise overview of my academic contributions to the field of policy evaluation. A list of my published papers and ongoing projects can be found on my website

(<https://www.rodriogopinto.net>). Instead, I will provide an outline that explains how my main academic output aligns with a broader research agenda centered around policy evaluation.

1. *Evaluating the Causal Impact of Early Childhood Interventions*

I have collaborated with several esteemed co-authors on multiple papers that focus on evaluating policies for early childhood interventions. These co-authors include James Heckman, a long-term collaborator, as well as Paul Gertler, Azeem Shaik, Gabriella Conti, Frances Campbell, and Sally Grantham-McGregor, among others. A consistent feature of these papers is the use of data from randomized controlled trials (RCTs) to examine the long-lasting effects of investing in disadvantaged children at a young age.

My research consistently demonstrates that providing high-quality early childhood education to disadvantaged families leads to numerous benefits. These benefits include improvements in cognitive abilities, social skills, and emotional well-being, which in turn contribute to enhanced academic performance and increased earning potential. Importantly, these advantages extend beyond educational and economic outcomes. For instance, our findings reveal that investing in early childhood education leads to reduced crime rates and incarceration, as well as improved physical and mental health.

An example of this research is the paper “Labor Market Returns to Early Childhood Stimulation: A 20-year Follow-up to an Experimental Intervention in Jamaica,” co-authored with Paul Gertler, James Heckman, Arianna Zanolini, Christel Vermeersch, Susan Walker, Susan Chang, and Sally Grantham-McGregor, and published in the journal *Science*. In this paper, we evaluate the impact of the Jamaican Intervention in Childhood on labor market outcomes in adulthood. Another paper, also published in *Science*, is titled “Early Childhood Investments Substantially Boost Adult Health” and co-authored with Frances A. Campbell, Gabriella Conti, James J. Heckman, Seong Moon, and Elizabeth P. Pungello. In this work, we investigate the long-term health impacts in adulthood of two primary early childhood interventions in the U.S. I was also responsible for designing the tailored methodology used in these papers, as well as for the estimation and inference of the empirical findings.

In the paper “Cognitive, Psychosocial, and Behavior Gains at age 31 Years from the Jamaica Early Childhood Stimulation Trial” (with Susan Walker, Susan Chang, Amika Wright, James Heckman, and Sally Grantham-McGregor), published in *Journal of Child Psychology and Psychiatry*, we investigate the effects of the intervention on cognitive and non-cognitive skills in later adulthood. Additionally, in the paper “The Effects of Two Influential Early Childhood Interventions on Health and Healthy Behaviour” (with Gabriella Conti and James Heckman), published in *The Economic Journal*, we focus on the impact of early childhood interventions on health outcomes in adulthood. In both papers, I was responsible for devising the appropriate methodology and computing the empirical findings.

2. *When the Golden Standard does not Shine: RCT Compromises and Small Sample Inference*

The method of Randomized Controlled Trials (RCTs) is widely considered the gold standard for assessing causal effects. Well-designed social experiments that employ RCTs enable researchers to evaluate causal effects using simple statistical techniques. However, most implementations of RCTs in social experiments suffer from compromises such as noncompliance, treatment contamination, and small sample sizes. Part of my research activity involves devising estimation and inference methods

that remain valid for compromised social experiments.

In the paper “Analyzing Social Experiments as Implemented: A Reexamination of the Evidence from the HighScope Perry Preschool Program” (with James Heckman, Seong Moon, Peter Savelyev, and Adam Yavitz), published in *Quantitative Economics*, we present methods for analyzing data from compromised social experiments. We investigate the compromising aspects of the randomization implemented in the Perry Preschool Program, a social experiment that provided preschool education and home visits to disadvantaged children. Previous analyses assumed that the planned randomization protocol was followed, but in reality, it was compromised in various aspects.

Our analysis accounts for several compromising aspects that typically occur in social experiments. We develop multiple-hypothesis testing that is valid for small sample sizes. By correcting for compromises, we find statistically significant effects of the program for both males and females. In the paper “Inference with Imperfect Randomization: The Case of the Perry Preschool Program” (with James Heckman and Azeem Shaik), forthcoming *Journal of Econometrics*, we focus on a general permutation method to develop a causal inference on multiple hypothesis testing of compromised randomized controlled trials.

3. From Effects of a Cause to Causes of an Effect

The primary goal of policy evaluations of social experiments is to assess the causal impact of a treatment on various outcomes of interest. This analysis is essential to assess the intervention’s effectiveness in shaping its participants’ lives. However, the evaluation of causal effects alone is insufficient in addressing the fundamental questions of how and why these effects are produced.

Mediation analysis seeks to uncover the underlying mechanism generating causal effects. It provides a more comprehensive and instructive assessment of the intervention since it allows the analyst to identify the intermediary variables which mediate the causal effect of the treatment on final outcomes. I have worked on several papers that made significant contributions to this field.

In the paper “Understanding the Mechanisms Through Which an Influential Early Childhood Program Boosted Adult Outcomes” (with James Heckman and Peter Savelyev), published in *American Economic Review*, we conduct a mediation analysis to explore the ways in which high quality early childhood interventions lead to positive outcomes later in life. Using longitudinal data on cognitive and personality skills from an experimental evaluation of the Perry Preschool program, we examine the channels through which the program successfully improved outcomes for both male and female participants. Our findings show that experimentally induced changes in personality skills significantly contribute to the adult treatment effects seen in these individuals.

In the paper “The Effect of Trade on Workers and Voters” (with Christian Dippel, Robert Gold, and Stephan Heblich), published in *The Economic Journal*, we investigate the economic causes of the increasing popularity of populist parties in industrialized countries. Through mediation analysis, we established that the impact of trade exposure on labor market outcomes has been a significant contributing factor to the rise in support for populist parties in Germany. Low-skilled manufacturing workers have been particularly affected by trade exposure to imports from low-wage countries, resulting in increased unemployment and labor market uncertainty, shifting political preferences towards nationalist parties.

In the paper “Econometric Mediation Analyses: Identifying the sources of Treatment Effects from Experimentally Estimated Production Technologies with Unmeasured and Mismeasured Inputs” (with James Heckman), published in *Econometric Reviews*, we delve into the theoretical foundations of econometric mediation analysis. We examine how to identify the production functions that produce treatment effects in experimental interventions where some inputs are mismeasured or omitted. This

type of empirical setup is a common challenge faced by economists trying to evaluate the mechanisms behind treatment effects in social experiments.

4. *Measuring the Overall Impact of an Intervention*

Cost-benefit analysis is a valuable tool to summarize the overall impact of an intervention into a single parameter that quantifies its economic efficiency. It stands in contrast to mediation analysis, since cost-benefit analysis aggregates causal effects, while mediation analysis decomposes the effects. A major benefit of cost-benefit analysis is to facilitate the comparison of various policies according to a consistent measure of economic efficiency.

In the paper titled “The Rate of Return to the High/Scope Perry Preschool Program,” (with James Heckman, Seong Moon, Peter Savelyev, and Adam Yavitz), published in the *Journal of Public Economics*, we evaluate the rate of return for the Perry Preschool Program. Previous studies on the program’s rate of return have not accounted for issues with the randomization protocol or reported standard errors. Our paper addresses these issues and conducts a thorough analysis of sensitivity to various assumptions. We find that the annual social rate of return for the program falls between 7% and 10%, and these returns are statistically significant for both males and females, outperforming the historical return on equity. Our estimated benefit-to-cost ratio supports these findings. This paper has received significant attention in the media and has been cited more than a thousand times.

5. *Beyond Treatment Exogeneity: Identification Assumptions in IV Models*

The identification of causal effects in RCTs is well-understood. Randomization ensures the exogeneity of treatment statuses when all agents comply with their assigned treatment. The identification breaks down if some agents choose not to comply with their assigned treatment. In this case, the randomization arms play the role of an instrumental variable capable of influencing the treatment choice but not enforcing it. Most importantly, causal effects can only be identified with additional assumptions. Some literature background is in order.

An iconic example of identifying assumptions in the binary choice model is the monotonicity condition of Imbens and Angrist (1994). The condition asserts that a change in the instrument induces all agents to alter their choice in the same direction, which enables the identification of the Local Average Treatment Effect. Angrist and Imbens (1995) extend this monotonicity condition to the case of multiple choices, which is equivalent to assuming an ordered choice model (Vytlacil, 2006).

A fascinating theme of my research agenda focuses on investigating novel conditions that enable the identification of causal effects in IV models with multiple choices. In the paper called “Unordered Monotonicity” (with James Heckman), published at *Econometrica*, we define and analyze a new monotonicity condition for identifying counterfactuals and treatment effects in unordered choice models. Our Unordered monotonicity condition implies and is implied by additive separability of choice of treatment equations in terms of observed and unobserved variables. We show that unordered monotonicity naturally arises in many economic settings in which the treatment does not have a natural order.

In general, the Ordered Monotonicity condition of Angrist and Imbens (1995) and the Unordered Monotonicity condition do not imply each other. However, these two conditions collapse to the same criteria when the choice is binary. Indeed, both conditions become equivalent to the monotonicity condition of Imbens and Angrist (1994).

This state of affairs raises several questions. Is there a criterion that enables us to compare notably different monotonicity conditions in a meaningful fashion? What are the choice restrictions shared by a

set of monotonicity conditions, and what are the choice restrictions that set them apart? Is there a minimal condition underlying all monotonicity conditions that are equivalent to Imbens and Angrist (1994) under binary choices? And if such a condition exists, does it have an economic interpretation?

I address these questions in the working paper called “Ordered, Unordered and Minimal Monotonicity Criteria” (with Manu Navjeeva). The paper uses the ordered and unordered monotonicity conditions as the leading examples to study symmetric characterizations of monotonicity conditions. The article leverages these symmetries to show that ordered and unordered monotonicities share a common condition called minimal monotonicity. Furthermore, the article shows that this novel condition is interpretable and informative in conducting causal inferences. The analysis also helps develop a formal criterion for comparing arbitrary monotonicity conditions.

6. *Using Economic Behavior to Enhance Policy Evaluations*

Economists have long used instrumental variables (IV) to conduct policy evaluations due to their ability to identify the causal effects of an endogenous treatment variable on the outcomes of interest. As mentioned, the identification of causal effects in IV models relies on assumptions that are often take the form of monotonicity conditions. For binary choice models, the monotonicity condition is straightforward and readily interpretable. However, when dealing with models involving multiple choices, the monotonicity conditions become more intricate and pose greater challenges in terms of interpretation.

In a series of papers, I explore the fact that monotonicity conditions can be equivalently expressed as choice restrictions. I leverage this insight to develop a simple yet general framework that employs classical economic behavior to produce identification assumptions in IV models. Specifically, choice restrictions arise by applying revealed preference analysis to the choice incentives induced by the instrumental variable. The framework is a powerful tool for identifying assumptions in IV models with multiple choices. It is also instructive in assigning economic interpretation to the monotonicity conditions frequently invoked in the IV literature.

In the paper “Beyond Intention-to-Treat: Using the Incentives of Moving to Opportunity to Identify Neighborhood Effects”, R&R at *Journal of Political Economy*, I use revealed preference analysis to identify neighborhood effects of the housing experiment called Moving to Opportunity (MTO). MTO is a housing experiment that offered vouchers to disadvantaged families to move from high-poverty to low- or medium-poverty neighborhoods. The experiment suffers from significant noncompliance, making it difficult to determine the causal effect of neighborhood relocation.

The paper exploits the choice incentives of the MTO experiment to provide a novel identification approach that secures the identification of the causal effects of living in different neighborhood types. The paper offers a significant empirical contribution to the MTO literature. It finds that while overall MTO estimates of labor market outcomes are not statistically significant, components corresponding to neighborhood effects of responsive families are economically and statistically significant. The paper supports a growing literature that shows evidence of the importance of neighborhood quality in the lives of its residents.

The working paper titled “Incentive-Based Identification in IV Models: The Economics of Monotonicity Conditions” (with Moshe Buchinsky) uses classical economic behavior to examine identification assumptions in IV models with multiple choices. The paper offers a significant contribution to the IV literature. We combine classic economic behavior from revealed preference analysis and the choice incentives generated by the design of the social experiment to create new classes of monotonicity conditions. We show that particular patterns of choice incentives can justify the monotonicity conditions

commonly assumed in IV literature. The paper demonstrates that IV-induced incentives can also generate a wide range of identification assumptions currently unknown to economists.

The paper “Causal Inference of Social Experiments using Orthogonal Designs,” (with James Heckman), published in the *Journal of Quantitative Economics*, introduces a novel application of orthogonal designs in randomized controlled trials through the use of revealed preference analysis. Orthogonal designs are a widely-used class of experimental designs that aim to determine efficient arrangements of treatment factors in RCTs. However, their usage in the social sciences has been limited due to challenges such as noncompliance, which can compromise the randomization process. Our study uses orthogonal designs to characterize choice incentives instead of treatment factors. This insight allows us to construct an instrumental variable (IV) model with an orthogonal array of choice incentives. We show how this incentive scheme can vastly outperform traditional randomized controlled trial designs.

7. Policy Analysis is Causal

I firmly believe that the study of causality is essential for conducting sound and innovative policy evaluations. On one hand, most of identification approaches used in economics stem from three primary approaches: matching (which includes RCTs), instrumental variables, or control functions. Despite their prominence, these approaches represent only a fraction of the identification techniques applicable to policy evaluations. On the other hand, policy evaluations that lack a well-defined causal model may rely on the uncritical use of econometric estimators with poorly defined or insufficiently understood sources of identification. As a result, these evaluations provide estimated effects whose causal interpretation is often unclear. With this awareness, I devote a significant portion of my academic endeavors in studying and contributing to the theory of causality and its relation to policy evaluations.

Haavelmo’s seminal 1943 and 1944 papers are the first rigorous treatment of causality. In them, he distinguished the definition of causal parameters from their identification. He showed that causal parameters are defined using hypothetical models that assign variation to inputs determining outcomes.

In the paper “Causal Analysis After Haavelmo” (with James Heckman), published at *Econometric Theory*, we embed Haavelmo’s framework into the recursive framework of Directed Acyclic Graphs (DAGs) commonly used in the literature of causality (Pearl, 2000) and Bayesian nets (Lauritzen, 1996). We compare the causal analysis based on a methodology inspired by Haavelmo’s ideas with other approaches used in the causal literature of DAGs.

In the paper “The Econometric Model for Causal Policy Analysis” (with James Heckman), published at *Annual Reviews of Economics*, we devise a causal framework called the hypothetical model inspired by Haavelmo’s ideas. We use the framework to map a range of econometric models of policy analysis. We then compare the causal framework with two alternative frameworks popular in statistics and computer science. We show that the econometric approach to causality enables economists to characterize and analyze a broader range of policy problems than alternative methods allow.

In the paper, “Causality and Econometrics” (with James Heckman), conditionally accepted at *Journal of Econometrics*, we clarify the limitations of the popular method of potential outcomes, commonly termed Rubin Causal Model, when compared to the structural equation approach. We also discuss the benefits and drawbacks of the Do-calculus causal framework advocated by Judea Pearl and co-authors.

Recently, I have been fascinated by the discussions surrounding Judea Pearl’s do-calculus (DoC) method. Guido Imbens and others have contributed significantly to this conversation. This recent interest in causality has prompted me to revisit an old academic project which aims to expand upon the nonparametric identification of causal effects in recursive causal models. The main benefit of the

DoC is that it is a complete method, meaning that for any nonparametric causal model if a causal effect is identified, it can be assessed through the reiterated application of the DoC algorithm. However, DoC has a few drawbacks: it is a cumbersome method only applicable to DAGs. My working paper called “Causal Calculus” uses the hypothetical model framework to overcome the limitations of the DoC. Similar to the DoC, the hypothetical model framework is complete. In contrast with the DoC, the hypothetical model is substantially simpler and relies only on standard statistical theory. Consequently, it is capable of assessing causal models outside the DAG paradigm.

Finally, in a submitted paper titled “Early Childhood Conditions and Adolescent Mental Health” (with Bilge Erten, Pinar Keskin, Huihua Xie, and Lianming Zhu), we use a Difference-in-Differences (DiD) design to examine the impact of early life circumstances induced by trade liberalization on adolescent mental health in China. Our model considers a moderator variable that determines the strength of the treatment’s effect on the outcomes. This model is highly relevant in the DiD literature and has gained widespread popularity. While the paper’s primary focus is empirical, we also investigate the assumptions necessary to establish causal interpretation for the DiD estimator commonly used in this type of model. Our findings show that children in prefectures with higher exposure to international trade policy changes showed a notable decrease in severe adolescent depression, as measured by the CES-D scale. These findings are not influenced by preexisting trends in the outcomes and remain consistent after controlling for baseline characteristics. Furthermore, we show that the mechanisms generating these effects are likely to be increased parental income, early childhood investments, and maternal care provision.

8. New Frontiers: Applying Machine Learning Methods to Policy Evaluations

In recent years, machine learning has emerged as a valuable tool for enhancing the precision, scalability, and robustness of the estimates in policy evaluations. My two latest projects contribute to applying machine learning techniques in evaluating the causal impacts of policy measures.

In a recent paper titled “Identification and Estimation in a Class of Potential Outcomes Models,” with Manu Navjeevan and Andres Santos, we characterize the identification of a broad class of causal parameters in IV models with multiple treatments and categorical instruments. We develop doubly robust moment functions to estimate these causal parameters employing machine learning techniques. We apply the methodology to evaluate a mediation model based on the MTO data. Our method not only guarantees double robustness against misspecification, as proposed by Robins and Rotnitzky (1995), but also possesses the mixed bias property as outlined in works by Chernozhukov et al. (2018; Rotnitzky et al., 2021). Furthermore, our approach performs the covariates selection and their transformations employing debiased machine learning methods as discussed in Belloni et al. (2017) and Chernozhukov et al. (2022, 2018, 2021).

I also use Machine learning techniques in the working paper titled “The Economics of Monotonicity Conditions: Exploring Choice Incentives in IV Models.” The paper uses the Oportunidades Intervention in Mexico to investigate the role of human capital on the decision to migrate to the US. In my upcoming project, I plan to investigate the expansion of early childhood education by the federal government of Brazil over the past decade. The objective is to assess the efficacy of this expansion using the rich, nationwide observational data available in Brazil.

Sincerely,

Rodrigo Pinto